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ABSTRACT

This annual listing of research in mathematics education contains annotated citations of research papers and monographs dated 1999 and abstracted for the ERIC database. Journal articles focusing on the interpretation and implications of mathematics education research are also featured. An index of dissertations by institution and a list of journals searched are included. (Author)

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ED 482 987

RESEARCH IN MATHEMATICS EDUCATION 1999

Edited by

Michelle K. Reed
Douglas T. Owens

U.S. DEPARTMENT OF EDUCATION
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Preface

The annual listing of research in mathematics education for many years was published as an issue of the *Journal for Research in Mathematics Education*, a publication of the National Council of Teachers of Mathematics. Two annual research listings for 1994 and 1995 were prepared by the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/CSMEE) with the financial support of NCTM. This is the fourth annual research listing prepared solely by ERIC/CSMEE.

In this listing each entry has been classified with ***Major*** and *Minor* codes, and all entries are indexed by ***Major*** codes. Dissertation abstracts which appeared in *Dissertation Abstracts International* during 1999 have been listed. Journal articles reporting research, as well as journal articles focusing on the interpretation and implications of research, have been included in this publication. Papers and monographs dated 1999 and abstracted for the ERIC database have also been included. Additionally, an index of dissertations by institution and a list of journals cited is provided.

We sincerely hope you find this listing useful.

The Editors

Michelle K. Reed
Wright State University

Douglas T. Owens
The Ohio State University

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Key to Codes

The following topic codes have been used to indicate the ***Major*** and *Minor* emphases of each dissertation, journal article, and paper in this listing. Each entry has been assigned a minimum of one and a maximum of three ***Major*** codes and any number of *Minor* codes. The combined topic index at the end of the volumes reflects only ***Major*** codes, with entries listed in 20 clusters of related topics.

The grade ***Level*** of each study is indicated in parentheses at the end of the list of codes. Please note that studies related to preservice or inservice teacher education are so indicated by the appropriate topic codes (*Prsv, Insv*). The ***Level*** designated on teacher education studies refers to the grade level(s) at which the intern or teacher participants teach.

Ach	Achievement
AdvM	Post-calculus mathematics
Aff	Affect
Alg	Algebra, pre-algebra
Anx	Anxiety (student's)
Arth	Arithmetic
A/S	Addition, subtraction
Assm	Assessment, evaluation
Att	Attitudes (student's)
Blf	Beliefs (student's)
Calc	Calculus, precalculus
Cltr	Calculators (general)
Clln	Classroom interaction
Comm	Communication
CAI	Computer-assisted instruction
Comp	Computers (general)
CC	Cross-cultural studies
Curr	Curriculum, programs
Decm	Decimals
D/R	Diagnosis, remedial mathematics
DscM	Discrete mathematics
Eqty	Equity
Eqv	Equivalence, proportions
Est	Estimation
Ethn	Ethnic, racial, cultural
Frac	Fractions, rational numbers
GCal	Graphing calculators
Gend	Gender differences
Geom	Geometry
Gift	Gifted (students)
Grpg	Grouping for instruction, cooperative learning
Impl	Implications of research, interpretations of research
Insv	Inservice teacher education, professional development
Int	Integers
IC	Integrated curriculum
Knw	Knowledge (student's)
Lang	Language, psycholinguistics
Lrnr	Learners (characteristics of)
LD	Learning disabled
Lrng	Learning, learning theories, cognitive development, constructivism
Manp	Manipulatives
Matl	Materials (texts, other resources)
Meas	Measurement
Mscn	Misconceptions
M/D	Multiplication, division
M/CBL	Microcomputer/calculator based laboratory
MMed	Multimedia
Mtcg	Metacognition, reflection
NSns	Number sense
Oral	Oral communication, classroom discourse
Patt	Patterns, relationships, math connections
Pers	Personality
Phil	Philosophy, epistemology
Plan	Planning, descision making
PlcV	Place value, numeration
Prob	Probability
Prf	Proof, justification
Prsv	Preservice teacher education
PS	Problem solving, reasoning
RaPc	Ratio, proportion, percent
Rep	Representations, modelling
Rsch	Research issues, methods
Revw	Reviews of research
Soc	Social factors, context, parents
Stat	Statistics
Styl	Learning style, cognitive style
TAnx	Anxiety (teacher's)
TAtt	Attitudes (teacher's)
TBlf	Beliefs (teacher's)
TKnw	Content knowledge (teacher's), pedagogical knowledge
Tchr	Teachers (characteristics of)
Tchg	Teaching (role, style, methods)
Tech	Technology (general)
Vis	Spatial visualization
Whol	Whole numbers
Writ	Writing, journals

Level Codes

ALL	All student levels	MS	Middle grades, 5-8
EC	Early childhood, K-4	PS	Post secondary
EL	Elementary, K-8	SE	Secondary, 5-12
HS	High school, 9-12	T	Teachers
K-12	All school levels	TE	Teacher education, teachers

Dissertations in Mathematics Education Reported in 1999

Gary Christie, Jennifer A. Kaminski, Michael Meagher, & James Quinlan
The Ohio State University

This section lists 293 dissertations in mathematics education research that were abstracted in *Dissertation Abstracts International* during 1999. Each entry is coded (see Key to Codes) with one to three **major** topic codes (in bold type) and any number of *minor* topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate topic codes (Prsv.Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teach, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 73). An index of dissertations by institutions is included at the end of this section (see page 41).

Adams, Marianna Moore. (1999). *State and district school reform policies: The effect of Goals 2000 state school reform policies on the Annenberg/Getty TETAC Project.*(The George Washington University). DAI-A 60/05, p. 1424, Nov 1999. [AAT 9932066]

A study of three school districts found that reform policies, organizational structure, evaluation, and processes had no direct effect on the first 18 months of TETAC. There was some interaction between the state's focus on reading, writing, and mathematics testing and the arts program.

Curr, IC, Comm (ALL)

Adams, Sharon Jones. (1998). *Persistence of academically talented adolescents in an accelerated mathematics program: A discriminant analysis.*(University of Maryland College Park). DAI-A 59/10, p. 3762, Apr 1999. [AAT 9908909]

Comparing students who persisted (n=80) in an accelerated secondary program with those who failed to persist (n=30), the study identified five variables that significantly discriminate between the two groups: SAT-Mathematics score, Algebra I grade, creativity team membership, and two sub-scales of the Harter Self-Perception Profile for Adolescents.

Gift, Lrnr, Att, Ach (HS)

Adamy, Peter Hilton. (1999). *An analysis of factors that influence technology integration by math teacher educators.*(University of Virginia). DAI-A 60/05, p. 1519, Nov 1999. [AAT 9930123]

Four math teacher educators were interviewed and observed in regard to their use of technology. Results suggest that the process of technology integration must have administrative and institutional support to succeed, must be based on an educator's definition of technology, and must focus on content area knowledge.

Tech, IC, Tknw (T)

Adleman, Kathleen A. (1999). *Problem solving strategies of young children working on a combinatorics task in a computer environment.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/03, p. 678, Sep 1999. [AAT 9922484]

Twenty-four fourth grade students were interviewed to investigate their heuristics and strategies and their justifications of solutions. Profiles of six representative students were made. Students created local organizational strategies. Four students moved toward global organization and two reorganized their thinking to justify cases.

CAI, PS, Prf (EL)

Ahn, Doehee. (1998). *An exploratory study into the development of cognitive and metacognitive processes in mathematics problem solving via computer.*(University of Alberta (Canada)). DAI-A 59/12, p. 4356, Jun 1999 ISBN: 0-612-34720-6. [AAT NQ34720]

Examination of the effects of explicit strategies instruction on (n=105) sixth-graders' problem solving skills and attitudes toward problem solving indicated that those exposed to this instruction increased their basic skills and those using computer-based instruction developed more positive attitudes.

Att, CAI, PS, Mtcg (MS)

Alfred, Siham Abouzeid. (1999). *An analysis of students' cognitive strategies employed in a learning experience from chaos theory.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/05, p. 1488, Nov 1999. [AAT 9929676]

Thinking strategies, mental constructions and cognitive difficulties of three college students attempting to solve a significant population growth problem were analyzed. The study focused on identifying the cognitive processes that the successful

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and unsuccessful students employed in a student-centered learning environment as opposed to the traditional environment of lectures and written material.

Lrng, PS, Styl, Knw, Gcal (PS)

Algaze, Louis J. (1998). *A comparison of mathematics achievement, attendance, and behavior of at-risk, minority, and female students in block-scheduled, and traditional settings.*(University of Miami). DAI-A 59/09, p. 3293, Mar 1999. [AAT 9905058]

Significant improvements were found for block-scheduled classes over traditionally scheduled classes: students had higher grade point averages and fewer behavioral referrals; at-risk students had higher Stanford Achievement Test scores; minority students had fewer behavioral referrals (n=180). Teachers generally teach similarly in the two types of setting.

Ach, Curr, Ethn, Tchg (SE)

Anderson, Dennis S. (1999). *Mathematics and distance education on the internet: An investigation based on transactional distance education theory.*(Columbia University). DAI-A 60/05, p. 1488, Nov 1999. [AAT 9930678]

Five U.S. NetMath programs and a course at the U.K. Open University were studied. Two survey questionnaires, one for teachers and the other for students, were distributed via the Internet. A majority of respondents reported having meaningful dialogue in the context of answering homework questions and increased learner autonomy. Some students were uncomfortable with this level of autonomy, however they were satisfied overall.

CAI, Comm, Att, Tatt, Calc (PS)

Arvedson, Paula Jane. (1999). *Numerical cognition in preschool children who have specific language impairment.*(University of California, Los Angeles). DAI-A 60/01, p. 96, Jul 1999. [AAT 9917268]

The effects of expressive language on numerical cognition in children with Specific Language Impairment compared to subjects matched on grammar production level and age was examined. Analyses indicate children with SLI are significantly more like their normally developing age-matched group than their grammar-matched group for all set sizes of all tasks.

NSns, Lang, LD (EC)

Axtell Dean, Kay Esther. (1998). *Study of hands-on activities in mathematics and science methods courses via interactive instructional television.*(Northern Arizona University). DAI-A 59/08, p. 2832, Feb 1999. [AAT 9902600]

Student teachers trained via interactive instructional television which included hands-on activities were found to be more likely to use hands-on activities in their classrooms versus students from interactive television courses which did not include any hands-on activities.

Manp, Prsv, Tech, Tchg (SE, TE)

Bang, Carolyn Yvonne. (1999). *Building metaphorical bridges: A teaching experiment on first grade students' relational understanding of equivalence.*(University of Minnesota). DAI-A 60/05, p. 1488, Nov 1999. [AAT 9929487]

Eight children participated in a teaching experiment using pan balances and wooden blocks. Results indicate that children at the operational level of cognitive development benefited from instructions in semantics of equivalence and transitive inference. Instruction on metaphors did not benefit the children. Even after extensive instruction, most participants did not shift from an operational to a relational interpretation of equivalence.

Lrng, Eqty, A/S (EC)

Baynes, Joyce Frisby. (1998). *The development of a van Hiele-based summer geometry program and its impact on student van Hiele level and achievement in high school geometry.*(Columbia University Teachers College). DAI-A 59/07, p. 2403, Jan 1999. [AAT 9839049]

Results of the two-week, 30-hour course was an increase in the level of geometric thinking (using the van Hiele model as a reference) for a majority of the sample, with the most effective components of instruction involving technology, hands-on manipulatives, and journal writing.

Geom, Ach, Lrng, Manp, Tech, Writ (SE)

Bedell, Janet P. (1998). *Effects of reading and mathematics software formats on elementary students' achievement.*(University of Miami). DAI-A 60/06, p. 1988, Dec 1999. [AAT 9934202]

Third and fourth grade students (n=557) from two comparable schools used software purchased from a publisher. School A students used a version resequenced to align with the scope and sequence of their mathematics and reading textbooks. School B students used the original software. Students using reformatted software achieved higher gain scores on

mathematics applications and computations and in total reading.

CAI, Gend (EL)

Bellisio, Carol Wenk. (1999). *A study of elementary student's ability to work with algebraic notation and variables.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/03, p. 679, Sep 1999. [AAT 9922485]

Students from grades four to seven (n=48) participated in problem solving involving algebraic concepts. The children invented a variety of notations to express their ideas and justify solutions.

Alg, Comm, PS (EL)

Bergthold, Trisha A. (1999). *Patterns of analytical thinking and knowledge use in students' early understanding of the limit concept.*(The University of Oklahoma). DAI-A 60/04, p. 1054, Oct 1999. [AAT 9925593]

Ten students participated in four task-based interviews. They had difficulty determining local function behavior and its implications on limit situations. Reading graphs and tables and relying on formula-based expectations led to conjecture of limits, but often erroneously due to partial analysis and inaccurate conclusions drawn from calculator results.

GCal, Lrng, Patt, Knw (PS)

Berryman, Howard G. (1999). *The effects of technology education labs on third-grade math scores.*(University of Sarasota). DAI-A 60/02, p. 401, Aug 1999. [AAT 9920887]

Findings showed a significant statistical difference in males' mathematics scores on the Iowa Test of Basic Skills who participated in the Technology Education lab when compared to males who did not.

Tech, Gend (EC)

Billings, Esther Marie Huntzinger. (1998). *Qualitative-based reasoning of preservice elementary school teachers in proportional situations.*(Northern Illinois University). DAI-A 59/09, p. 3383, Mar 1999. [AAT 9906418]

Qualitative-based reasoning components including anticipation, coordination of quantities, compensation, reversibility, visualization, generalization, and flexibility of thought were studied. Findings indicate that these components are interconnected and all students relied on qualitative-based reasoning to solve proportion problems.

Eqv, RaPc, PS (EL, TE)

Bird, Jo Beth Hinson. (1999). *An academic comparison between Project CHILD and the traditional classroom.*(University of Sarasota). DAI-A 60/03, p. 633, Sep 1999. [AAT 9922208]

The results of the Iowa Test of Basic Skills (ITBS) for third and fifth grade students were analyzed. In reading comprehension and mathematics computation, children participating in Project CHILD scored significantly higher than traditionally educated students.

Ach, Assm, Curr (EL)

Biske, Harry. (1998). *Determining and examining gender and/or experience differences in students' intuitions of chance, probability and uncertainty.*(The Florida State University). DAI-A 59/07, p. 2403, Jan 1999. [AAT 9839757]

College students in pre-statistics (n=156) answered multiple-choice questions, and a subsample (n=9) was interviewed. Only 1 of 15 problems tested significantly different for gender and experience in statistics or probability. No interview questions were different for gender, but for the significant test question, experienced interview respondents reasoned incorrectly, and some inexperienced gave appropriate reasoning.

Gend, Prob, Stat, Knw (PS)

Blackburn, Lynne Michel. (1998). *Influences on the planning practices of elementary teachers of multiage children for mathematics instruction.*(University of Northern Colorado). DAI-A 59/08, p. 2858, Feb 1999. [AAT 9901929]

Ten teachers of students from kindergarten to fifth grade participated. All displayed difficulty with the multiage philosophy, when planning developmentally appropriate mathematics lessons. All teachers described mathematics as discrete, sequential, and they found difficulty making connections with other subjects. Four teachers felt confident and six lacked confidence in their mathematics planning.

Insv, Plan, Curr, TKnw (EL, T)

Blasquez, Elizabeth Ann. (1998). *The relationship between teachers' conceptual framework and pedagogical beliefs to the structure and delivery of mathematics lessons.*(University of San Francisco). DAI-A 59/12, p. 4385, Jun 1999. [AAT 9914686]

Twenty grades 3-5 teachers participated. The study concluded that: teachers' pedagogical beliefs are related to implementation of constructivist lessons,

and teachers' conceptual framework influences the treatment of content in instruction.

Curr, TBlf, Lrng, Tchg (EL, T)

Boone, Glenda Lanette. (1999). *Cognitive self-instruction to foster self-regulation in regular education students.*(University of Georgia). DAI-A 60/05, p. 1444, Nov 1999. [AAT 9929020]

Seventy-seven students participated in a study where some were given self-directed study skills instruction, some teacher-directed instruction, and some no special instruction. Results support the use of cognitive self instruction of study skills and attention problems, but failed to support its use in mathematics, reading, science, and social studies.

Lrng, Curr, Styl (EL)

Botta, Vincent Alan. (1998). *The effect of instructional method on use of heuristics and statistics comprehension.*(Georgia State University). DAI-A 59/07, p. 2433, Jan 1999. [AAT 9839246]

The activity-based instructional methodology positively affected students' use of heuristics and the overall effectiveness of statistical instruction. Instruction on heuristics positively impacted students' use of heuristics and statistical comprehension.

Stat, Tchg, Curr (HS)

Bourquin, Steven Douglas. (1999). *The relationship among math anxiety, math self-efficacy, gender, and math achievement among college students at an open admissions commuter institution.*(Ohio University). DAI-A 60/03, p. 679, Sep 1999. [AAT 9923662]

Females reported higher levels of math anxiety and males reported higher levels of math self efficacy; however, underconfident females posted a higher average in math achievement than overconfident males. In addition, employed males performed significantly better than employed females.

Anx, Gend, Soc, Lrng (PS)

Brendefur, Jonathan Lloyd. (1999). *High school mathematics teachers' beliefs about learning, pedagogy, and mathematics and their relationship to teaching authentically.*(The University of Wisconsin - Madison). DAI-A 60/06, p. 1882, Dec 1999. [AAT 9914775]

Teachers differed in their beliefs about how students learn, how instruction should ensue, and the nature of mathematics, but within each category beliefs were consistent. Belief authenticity was directly related to components of authenticity in instruction. Furthermore, teachers' beliefs about Construction of Knowledge were the best indicators of authentic practices, followed by beliefs about Depth of Knowledge.

Tblf, Tknw, Tchg (T)

Breneman, Carol L. (1998). *What is the effect of block schedules on algebra I achievement?*(University of Central Florida). DAI-A 59/07, p. 2404, Jan 1999. [AAT 9841673]

No significant differences were observed between the groups on achievement as measured by county subject-area test results. Students on a block schedule (n=170) did better than students on a traditional schedule (n=360) when achievement was measured by course grades and mathematical aptitude was considered.

Alg, Ach, Curr (HS)

Brown, Bruce Richard. (1999). *A study on the use of frequent quizzing as a teaching strategy: Does it effect achievement in mathematics?*(George Mason University). DAI-A 60/02, p. 370, Aug 1999. [AAT 9919829]

The effect of frequent unannounced quizzes on student achievement on biweekly tests was examined. Students from the highly motivated advanced analysis classes achieved higher on their mean unit test scores when quizzes were administered. Students in Pre-Calculus classes and Algebra 2 classes showed no difference.

Assm, Ach, Calc, Alg (PS)

Brown-Kovacic, Cheryl Lee. (1998). *Construct validity of a math performance assessment project.*(The University of New Mexico). DAI-A 59/11, p. 4115, May 1999. [AAT 9911740]

No differences in gender performances were found on the eight mathematics performance tasks, but differences existed between Anglo and Hispanic American performance. Mathematics performance assessments appeared to be more strongly related to Analytical Thinking or Language Achievement constructs than a traditional Mathematics Achievement construct represented by ITBS subtests.

Assm, Gend, Ethn (SE)

Bruno, Linda N. (1998). *Predicting mathematics performance: A structural equation model.*(University of Rhode Island). DAI-B 59/08, p. 4497, Feb 1999. [AAT 9902554]

Personality and socialization factors contributing to mathematics performance were investigated. Men reported significantly higher mathematics self-efficacy than women. This research refutes claims that men are inherently better at mathematics, suggesting that teachers and parents contribute to the development of mathematics self-efficacy and lessening of mathematics anxiety.

Gend, Att, Anx, Ach (PS)

Bryant, Debra Deon. (1998). *A comparison of success rates in grade maintenance in R/D mathematics through level 1 mathematics of TTU students and transfer students to TTU from other state postsecondary institutions from fall 1994 through spring 1996.*(The University of Tennessee). DAI-A 59/08, p. 2813, Feb 1999. [AAT 9903894]

The study investigated impact of differences in the remedial/developmental mathematics curricula of students who transfer (n=70) to Tennessee Technological University. No significant differences were found in grade point average in either remedial or developmental or level 1 mathematics for any comparison (non-transfer, n=419).

D/R (PS)

Bucci, Terri Teal. (1999). *Expert mathematics teachers' parallels to worldviews: Investigating pedagogical responses to novice mathematics teachers' concerns.*(The Ohio State University). DAI-A 60/02, p. 370, Aug 1999. [AAT 9919847]

The observed practices of three expert teachers and their verbal responses to the concerns of novice mathematics teachers were analyzed with possible alliances to the ontology, epistemology, and methodology of three research paradigms: positivism, interpretivism, and critical theory.

Phil, Prsv, TKnw, Soc (TE, T)

Buerman, Margaret Cross. (1998). *Predicting success in middle school algebra.*(The University of Nebraska - Lincoln). DAI-A 59/08, p. 2833, Feb 1999. [AAT 9902948]

The study investigated selection criteria for placing students in an urban district. Results indicated significant relationships between standardized test scores and success in algebra, success in placing African American students, and more success for females than males. Students completing seventh-grade algebra outperformed students completing eighth-grade algebra.

Grpg, Gend, Ethn, Curr (MS)

Burchill, John Joseph. (1999). *Effectiveness of the summer school mathematics program at an inner city high school as evidenced by students' success on the state-mandated high school proficiency test.*(University of Sarasota). DAI-A 60/05, p. 1402, Nov 1999. [AAT 9931536]

Summer-school students were passing the mathematics portion of the HSPT at a rate far below the rate for regular students and far below the expectations. Younger students outperformed older students. Latino females outperformed black males.

Ach, Curr, Alg, Ethn, Gend (HS)

Burkett, Denine Carol. (1998). *Making connections between the tabular, symbolic, and graphical representations in the context of writing activities used during instruction of functions.*(University of Pittsburgh). DAI-A 60/02, p. 320, Aug 1999. [AAT 9919261]

The strength of connection, and ways students made connections, between tabular, symbolic, and graphical representations, in the context of writing activities used in teaching functions was examined. Among the findings was that when translating from tabular to another representation students often introduced the third additional representation.

Writ, Lrng, Lang, Alg (PS)

Bush, Jennifer Anne. (1998). *An exploratory study of two students' understandings of group theory concepts prerequisite to the concept of quotient group.*(University of Northern Colorado). DAI-A 59/08, p. 2894, Feb 1999. [AAT 9902405]

The researcher observed a class studying group theory for about 8 weeks, and interviewed two of the students. Results indicate that this class did well with concepts of normality, cosets, coset multiplication, and forming quotient groups in untimed, unpressured situations. Performance was poorer in timed, pressure situations.

Alg, Prf (PS)

Camp, Dane R. (1999). *A cultural history of fractal geometry: The biography of an idea.*(Loyola University of Chicago). DAI-B 60/02, p. 672, Aug 1999. [AAT 9917760]

An understanding of fractal geometry by first considering its roots in human culture and the natural environment is provided. The discussion includes a number of current applications of fractal geometry and its importance in the area of mathematics education.

Geom, Phil, Soc (Not given)

Campbell, Stephen Roderick. (1998). *Preservice teachers' understanding of elementary number theory: Qualitative constructivist research situated within a Kantian framework for understanding educational inquiry.*(Simon Fraser University (Canada)). DAI-A 60/06, p. 1948, Dec 1999. [AAT NQ37688]

Preservice teachers' knowledge of whole numbers, rational numbers, and number theory was studied using qualitative methods guided by constructivism. Results revealed their difficulty with comprehension. The study also addressed contradictory philosophical assumptions of the research resolved by a Kantian account of constructivism which can lay a new framework for understanding educational inquiry .

Prsv, Lrng, TKnw, Phil, Rsch, NSns (TE)

Canfield, Ward Evan. (1999). *College quantitative literacy approaches and a new way of analyzing functions and data.*(University of Illinois at Chicago). DAI-B 60/06, p. 2731, Dec 1999. [AAT 9934751]

This dissertation discusses and assesses quantitative literacy. A prototype college quantitative-literacy course is described which minimizes articulation difficulties that arise from different view of qualitative literacy. Here, functions are analyzed using finite differences, intuitive calculus, and computer tools.

Comm, Rep, Calc, Comp (PS)

Carbone, Rose Elaine. (1998). *A sequel to sequal: Quantitative literacy workshops and their effects on teaching practices.*(University of Pittsburgh). DAI-A 60/02, p. 391, Aug 1999. [AAT 9919263]

The impact of the Statistics Education through Quantitative Literacy (SEQuaL) workshops on teachers' knowledge and classroom practice was studied. Among the findings was that this professional development experience had an immediate effect on teachers and that a well-designed professional development experience can serve as a catalyst for change.

Insv, Stat, Curr (TE)

Carriveau, Ronald S. (1999). *A validity study of total score versus strand scores for a multi-level curriculum-based mathematics test.*(The University of Arizona). DAI-A 60/04, p. 1095, Oct 1999. [AAT 9927504]

A standardized mathematics test was created with different categories (strands): Number Sense, Data Analysis, Algebra, Geometry, Measurement, and Structure/Logic. Evidence supported an overall dimension called mathematics, but that there was also evidence to support other dimensions which reflected the six mathematics strands.

Assm, Alg, Geom, NSns (K-12)

Carter, Michael Anderson. (1999). *Student autonomy and making meaning in an urban small school.*(University of Illinois at Chicago). DAI-A 60/06, p. 1883, Dec 1999. [AAT 9934753]

A one-year case study of a small school implementing Trailblazers, a reform curriculum, is described. Detailed narratives present issues of student autonomy and teacher authority and address the matter of what constitutes education at its best and the conditions under which excellent teaching and effective learning occur.

Curr, Lrng, Ethn (K-12)

Cates, Janie Marie. (1998). *The teacher's role in the utilization of the graphing calculator in teaching graphing linear functions in middle school algebra i.*(The Florida State University). DAI-A 59/07, p. 2404, Jan 1999. [AAT 9839759]

The purpose of this study was to provide a rich description of a middle school mathematics teacher's use of a graphing calculator in teaching graphing of linear functions.

Alg, GCal, Curr (MS, T)

Celedon, Sylvia. (1998). *An analysis of a teacher's and students' language use to negotiate meaning in an ESL/mathematics classroom.*(The University of Texas at Austin). DAI-A 59/09, p. 3331, Mar 1999. [AAT 9905704]

The purpose was to describe how English as a second language (ESL) students and their teacher negotiate meaning, explore problem-solving strategies used by ESL students and their agreement with ideas presented in class, and generate a theory about language use. Results support the use of both languages for problem-solving success.

Ethn, Lang, PS, Comm (SE)

Cha, Insook. (1999). *Prospective secondary mathematics teachers' conceptions of function: Mathematical and pedagogical understandings.*(The University of Michigan). DAI-A 60/05, p. 1489, Nov 1999. [AAT 9929793]

Twenty-one preservice teachers were interviewed before and after completing an instructional unit on mathematical functions. Subjects improved their understanding of definitions and the impact of mathematically accurate presentation of these to

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students. However, none thought that function was a good vehicle for revealing the excitement and beauty of mathematics.

Prsv, Tknw, TBlf, Tchg, Alg (TE)

Chacko, Mathew Vadakkan. (1999). *Public key cryptosystems: History and development.*(Columbia University). DAI-A 60/01, p. 85, Jul 1999. [AAT 9916863]

A comprehensive history and discussion of public key systems of encryption and decryption in a form accessible to instructors of mathematics at undergraduate level was prepared. The work was evaluated by a panel of experts who found the history to be reasonably comprehensive and the mathematics to be somewhat above the undergraduate level.

Alg, Soc (PS)

Chao, Jenyi. (1999). *Effects of structured teaching method on students' understanding of angle and rotation in LOGO geometry.*(Arizona State University). DAI-A 60/03, p. 634, Sep 1999. [AAT 9923528]

Eighty fifth grade students participated in a study of Logo-based curriculum. The results show that students under structured teaching method and normal Logo environment outperformed students under unstructured teaching method.

Tchg, Geom, Curr (MS)

Charles, Karen Jungblut. (1999). *Changing the attitudes and practices of professional developers through a constructivist model: The technical assistance academy for mathematics and science services.*(The University of North Carolina at Greensboro). DAI-A 60/06, p. 1840, Dec 1999. [AAT 9933837]

All 45 professional developers participating in the study demonstrated use of new skills and had a clearer understanding and appreciation of issues such as networking, collaboration, content and staff development standards, equity, and community building. Knowledge developed in a constructivist setting transferred into effective facilitator practices.

Lrng, Tchg (T)

Chen, Mei Huei. (1998). *Children's solution of arithmetic word problems as a function of number size.*(The University of Connecticut). DAI-B 59/10, p. 5597, Apr 1999. [AAT 9909104]

This study tested whether 5- and 6-year-old children's solving of "change" and "combine" problems varies as a function of the size of the numbers involved. The analysis indicated that larger numbers reduced problem understanding as well as the correct carrying out of computations.

Arth, NSns, Lrng (EC)

Chi, Jerry Liang-Yueh. (1998). *The structural components of statistics test anxiety.*(Illinois State University). DAI-A 59/12, p. 4385, Jun 1999. [AAT 9914566]

Results indicate that statistics test anxiety is an independent anxiety, without strong connection either individually or in combination with computer anxiety, general test anxiety, general anxiety, a student's mathematical self-concept, or prior achievement. Statistics test anxiety appears to be explained on two subscales, worry and emotionality.

Anx, Stat (PS)

Chilcoat, Richard Alan. (1998). *The effect of a college algebra teaching method using a teacher-generated concept map, writing, and graphing calculators on student attitudes/beliefs and conceptual understandin g.*(University of Northern Colorado). DAI-A 60/04, p. 1055, Oct 1999. [AAT 9925009]

The results of the study indicated that there were not significant differences in procedural or conceptual scores nor in attitudes/beliefs of students (n=130) of either the proposed or traditional curriculum. Further investigation is warranted into why students of the experimental group had higher conceptual scores. Students found graphing to be important, but some had more trust in a symbolic approach.

Alg, Att, Blf, Lrng, GCal (PS)

Choi, Bune. (1998). *A structural model of problem-solving ability, self-efficacy, effort, worry, and achievement in calculus.*(University of Southern California). DAI-A 60/01, p. 64, Jul 1999. [AAT 9919024]

The study sought a confirmatory factor analysis with problem-solving ability, a second order factor, defined by first order factors of domain knowledge, problem-solving strategy, and motivation. It was found that the second-order factor of problem-solving ability can be decomposed into the first-order factors.

PS, Att, Knw, Calc (Not given)

Cipoletti, Beth. (1998). *The relationship between gender, faculty development, and class size and sense of efficacy of college mathematics teachers.*(West Virginia University). DAI-A 60/04, p. 949, Oct 1999. [AAT 9927859]

Questionnaires were completed by college mathematics professors. There was no significant difference in efficacy levels between males and

females or with respect to class size or faculty development. Teachers with high or mid-low levels of teaching efficacy made more presentations than others. Female teachers made more presentations at faculty development activities than males.

Tatt, Gend, Clln (T)

Clement, Lisa Lorraine. (1999). *The constitution of teachers' orientations toward teaching mathematics.*(University of California, San Diego). DAI-A 60/06, p. 1949, Dec 1999. [AAT 9935477]

Teaching style and content of a conceptually-oriented and a calculationally-oriented professor were analyzed. The beliefs and implementation of both remained constant. The conceptually-oriented teacher focused lectures on a unifying idea and its relationship to procedures and reasoning.

Tchg, TBlf (T)

Cohen, Louis Samuel. (1999). *The effect of teacher-coordinated participation in informal authentic activities on sixth-grade students' mathematics anxiety.*(University of Lowell). DAI-A 60/05, p. 1489, Nov 1999. [AAT 9932801]

Teachers in an experimental group participated in a workshop to decrease students' mathematics anxiety. Students of these teachers and those of a control group were compared to address relationships between anxiety and informal learning setting, teacher preparation, student gender, group work experience, and performance.

Anx, Clln, Curr, Gend (MS)

Collins, Ruth Dilts. (1998). *A measure and analysis of implementation of reform standards in mathematics at two-year colleges.*(Widener University). DAI-A 59/10, p. 3789, Apr 1999. [AAT 9908219]

Results found courses developed specifically for preservice teachers to be less likely to use the lecture format, more likely to incorporate discovery learning through group activities, more likely to stress the communications standards, and more likely to include alternative assessment measures.

Curr, Prsv (TE)

Cran, Margaret Robinson. (1998). *Correlations between student presage variables and performance on the mathematics subtest of the Florida college level academic skills test.*(University of South Florida). DAI-A 59/07, p. 2404, Jan 1999. [AAT 9842145]

Data were drawn from 4,129 first time CLAST examinees, and supported the following hypotheses: students who do poorly on entry level subtests (SAT, ACT, etc.) are more likely to fail CLAST mathematics, females are more likely to fail than males, and Hispanics and African Americans are more likely to fail than Caucasians.

D/R, Ethn, Gend (PS)

Creech, Patricia C. (1998). *How teachers' understanding of the mean relates to their lesson planning.*(The University of North Carolina at Greensboro). DAI-A 60/02, p. 320, Aug 1999. [AAT 9919180]

The relationship between knowledge of the concept of mean and lesson planning was studied in teachers of mathematics in grades four through eight (n=18). Teachers with little teaching experience or mathematics education background had a procedural understanding of the mean and only provide instruction at a procedural level.

TKnw, Stat, Tchg (EC, MS, T)

Crider, Margaret Riggle. (1998). *The effects of using 'splitting' multiplicative structures on students' understanding of integer exponents.*(Texas A&M University). DAI-A 59/12, p. 4385, Jun 1999. [AAT 9915224]

Students from control and experimental groups took a pretest and posttest on integer exponents and rated their self-confidence. The experimental curriculum emphasized isomorphism between the additive structure of exponents and the multiplicative structure of powers. The experimental group showed limited improvement in achievement and no improvement in self-confidence.

Alg, Att (PS)

Crumbaugh, Carol J. (1998). *'Yeah but I thought it would still make a square': A study of fourth-graders' disagreement during whole-group mathematics discussion.*(Michigan State University). DAI-A 60/03, p. 645, Sep 1999. [AAT 9922304]

The meaning, purpose, and discourse of classroom disagreements were studied. Both social and academic competencies were necessary for productive mathematical disagreements. With excessive interactional aspects, discussions were less productive. Teacher's role emphasized mathematical significance.

Lrng, Oral, Clln (EL)

Davis, Gail Marie. (1997). *Discovering Nel Noddings' ethic of care in American multiage and Russian classrooms: An ethnographic study.*(Seattle University). DAI-A 60/03, p. 655, Sep 1999. [AAT 9923896]

The Nodding model of schooling would change the basis of education to caring, seeking to provide consistency in people, place, and purpose for students. Two groups of students, parents, and teachers were studied. When students remained with the same teacher for at least two years, a caring classroom did develop.

Ethn, Grpg, Tchg, Soc, Gend (K-12)

Denson, Wanda Jean. (1998). *A comparison of student algebra I test scores in tech prep and non-tech prep schools in Mississippi.*(The University of Mississippi). DAI-A 59/10, p. 3762, Apr 1999. [AAT 9908519]

Algebra I test scores were analyzed by gender, race, and school accreditation level. Findings indicate no significant difference in test scores between tech prep (n=8,618) and non-tech prep students (n=4,935), and no interaction based on gender. Significant differences were found based on race and accreditation level.

Alg, Gend, Ethn (HS)

Dickerson, Valerie Meisner. (1999). *The impact of problem-posing instruction on the mathematical problem-solving achievement of seventh graders.*(Emory University). DAI-A 60/05, p. 1489, Nov 1999. [AAT 9931793]

Results of the two-year study indicate that problem-posing instruction, where students write problems using their own language, increases the problem-solving achievement of students of all ability levels. Females were found to be more successful with certain types, males with others.

Gend, PS, Styl (MS)

Donald, Jack Bradshow. (1998). *Technology in mathematics education: A descriptive study of the availability and uses of calculators and computers in public high school mathematics classes in the state of Virginia.*(Virginia Polytechnic Institute and State University). DAI-A 59/10, p. 3762, Apr 1999. [AAT 9905181]

By surveying mathematics department heads (n=80), the study investigated teachers' beliefs, attitudes, and responses to technology. Results indicate that state financial support is essential, state mandates are a necessary impetus for some teachers to incorporate technology, and teachers took a reactive approach to professional development activities.

GCal, Insv, Comp, TAtt, TBlf (SE, T)

Dorner, Celine D'souza. (1998). *Gender differences in the prediction of college mathematics course performance.*(Seattle University). DAI-A 60/03, p. 669, Sep 1999. [AAT 9923895]

When the performance of college freshmen mathematics students was studied, gender difference in SAT-M scores and predicted versus actual grades existed. Statistical analysis found that by using a combination of the best predictor variables, one equation can well predict mathematics grades.

Ach, Gend, Rsch (PS)

Drottar, John F. (1998). *An analysis of the effect of the graphing calculator on student performance in algebra II.*(Boston College). DAI-A 60/01, p. 56, Jul 1999. [AAT 9915557]

Treatment and control groups (n=22, 23) were examined to see whether graphing calculator use improves student performance in Algebra II. The greatest benefits related to graphing calculator use were that it made the work easier and enhanced student visualization of Algebra II concepts.

GCal, Vis, Alg (HS)

Dunn, Thea Keremes. (1998). *Mathematics teaching and learning in an alternative high school program: A qualitative study of preservice teachers and learners.*(Washington State University). DAI-A 60/01, p. 85, Jul 1999. [AAT 9917420]

A guided preservice program for the preparation of secondary mathematics teachers in an alternative high school program with at-risk learners was studied. The experience enhanced preservice teachers' self-concepts and their perceptions of at-risk learners, enabling them to set higher expectations for learners.

Prsv, Tatt, LD (HS, TE)

Dupree, Gloria Nan. (1999). *Mathematical empowerment: A case study of relational classroom learning.*(The University of Oklahoma). DAI-A 60/04, p. 1055, Oct 1999. [AAT 9925596]

Students in a critical-thinking course with a sensitive and nurturing atmosphere had an increase in positive attitude and felt mathematically empowered.

Att, Clln, Lrng, Patt, Gend (PS)

Eaton, Marian S. (1998). *Teaching high school mathematics to English learners: Practice as policy.*(Stanford University). DAI-A 59/10, p. 3719, Apr 1999. [AAT 9908750]

The study examined English learners who joined formerly "ordinary" classrooms, and the contextual factors that shaped teachers' practices. It describes

realities in two high schools faced by a constantly changing population, challenges of curriculum reform, differing levels of mathematical and English skills of students, the broad range of English proficiencies, and the necessity of bilingual aides.

Ethn, Tchg, (Curr, Soc)

Edmonds, Graydon Preston, Jr. (1998). *Parent involvement: Relationships with algebra I achievement at the secondary school level.*(Texas A&M University-Commerce). DAI-A 59/07, p. 2264, Jan 1999. [AAT 9841388]

A questionnaire to determine the relationship between parent involvement and achievement, student gender, socio-economic status, and grade level was used. Results indicated that ninth graders scored higher on achievement than tenth graders, parents most involved with school activities had children with lower achievement, and gender played no role.

Soc, Alg, Gend (SE)

Elshafei, Donna Lynne (Neumann). (1998). *A comparison of problem-based and traditional learning in algebra ii.*(Indiana University). DAI-A 60/01, p. 85, Jul 1999. [AAT 9919416]

Achievement and attitudinal differences between traditional and problem-based teaching methods with high school algebra II students (n=342) were investigated. Results indicated that students prefer a more constructivist form of instruction and that students solving problems in groups performed better.

Grpg, Lrng, Tchg, Alg (HS)

Ely, Jane Alice. (1998). *Interest in mathematics and science among students having high mathematics aptitude.*(State University of New York at Stony Brook). DAI-A 60/02, p. 553, Aug 1999. [AAT 9920401]

Why men and women differ in their interest in mathematics and science and in the pursuit of careers in mathematics and science was investigated. No gender differences were found in course selection, attitudes towards mathematics, and career choice among men and women college students who all had high mathematics ability.

Gend, Att, Aff, Gift (PS)

Enyart, Susan Elaine. (1998). *Professional development for inservice mathematics teachers: An exploratory study comparing programs funded by the national science foundation in two eras of mathematics education reform.*(The Ohio State University). DAI-A 59/10, p. 3763, Apr 1999. [AAT 9911186]

The study compared reforms of the sixties and nineties. Projects from each era differed in nearly every aspect of their organization, content, and results. Professional development programs reflected the forces, issues, and expectations of each era. The sixties reform did not last. Programs in the nineties have responded to concerns which surfaced in the sixties.

Insv, Soc (T)

Fairman, Janet C. (1999). *Policy and practice: The tension between assessment reform in Maine and Maryland and teachers' practice in middle-school mathematics.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/02, p. 370, Aug 1999. [AAT 9918317]

Teachers' learning and the role of policy supporting that learning within the context of the current reform agenda was examined. While most teachers continued to hold conventional views of mathematics and student learning, a few offered students the opportunity to develop conceptual ideas and apply mathematics to nonroutine problems.

Curr, Lrng, TBlf, TKnw (MS)

Fan, Lianghuo. (1998). *The development of teachers' pedagogical knowledge: An investigation of mathematics teachers in three high-performing high schools.*(The University of Chicago). DAI-A 59/07, p. 2322, Jan 1999. [AAT 9841511]

The study identified sources and their contribution to pedagogical knowledge development. Findings suggest that the most influential sources are teaching experience, reflection, and collegial interaction. Inservice training and professional activities were also important. Least important were preservice training, reading professional books and journals, and previous experiences as students.

TKnw, Insv (T)

Feldberg, Suzanne. (1998). *A comparison of different types of mathematical problem-solving hints selected by concrete and formal operational subjects in a hypercard environment.*(Columbia University). DAI-A 59/07, p. 2404, Jan 1999. [AAT 9838922]

Four hint types were explored with seventh and eighth graders: pictorial, numerical, structural, and referential. Significant correlations were found between performance on a standardized test and both performance on cognitive skills and problem-solving tasks. No significant differences were observed between the hint preferences of concrete and formal operational students.

PS, Lrng, Tech (SE)

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Fleming, Kandace Kay. (1998). *The effect of self-efficacy, gender, self-concept, anxiety, and prior experience on a model of mathematics performance.*(University of Kansas). DAI-A 59/09, p. 3418, Mar 1999. [AAT 9905449]

Results of this questionnaire study with graduate students suggest that self-concept has a stronger influence on performance than self-efficacy, and there are significant gender differences in anxiety and high school mathematics experiences. Gender was found to relate significantly to self-concept in only one of the structural models.

Gend, Att, Anx, Lrng (PS)

Flores, Carmilva Souza. (1999). *Extending teacher reform and professional development: The case of a school on probation.*(University of Illinois at Urbana-Champaign). DAI-A 60/03, p. 646, Sep 1999. [AAT 9921686]

Teacher activity was observed at an inner-city elementary school on probation. The school had been affiliated with the Chicago Teachers Academy of Mathematics and Science. The need for change was acknowledged, but improvement in mathematics was slow. Science was seldom taught. A desire for a quick fix was present The Teachers Academy seemed powerless in changing curriculum.

Curr, Insv, Tchg (T)

Flowers, Judith Mary. (1998). *A study of proportional reasoning as it relates to the development of multiplication concepts.*(The University of Michigan). DAI-A 59/10, p. 3763, Apr 1999. [AAT 9909837]

Three instructional programs were studied: a reform program encouraging reasoning, a reform program teaching conventional procedures, and a traditional program. Results indicate that the fourth grade students (n=137) from the reasoning program were more successful at extending that knowledge to proportional reasoning tasks and used more sophisticated reasoning and problem-solving strategies.

Curr, RaPc, PS, M/D (EL)

Forbes, Jacqueline Baker. (1999). *The effects of classroom organization on academic achievement in suburban elementary students in multi-grade and single-grade classrooms.*(Boston College). DAI-A 60/03, p. 655, Sep 1999. [AAT 9923415]

Achievement of students placed in multi-grade classrooms for first, second, and third grade versus traditional classrooms was studied. The multi-grade group achieved higher scores in mathematics and reading comprehension, though not significantly. There was a significant difference favoring multi-grade mathematics for boys.

Ach, Grpg, Gend (EC)

Foret, Katia F. Simone. (1998). *Teaching induction: Historical perspective and current views.*(The American University). DAI-A 59/09, p. 3377, Mar 1999. [AAT 9908153]

This dissertation presents the historical development of mathematical induction. Chapter I discusses its importance in modern mathematics, Chapter II looks at contributions of various mathematicians, Chapter III reviews the literature on teaching induction, and Chapter IV analyzes high school and college text books.

Prf, Geom (HS, PS)

Fox, Thomas L., Jr. (1998). *The effects of an individualized, self-paced instructional model on the achievement of college students enrolled in intermediate algebra.*(The University of Tennessee). DAI-A 60/03, p. 679, Sep 1999. [AAT 9923286]

The proposed model is a worthy alternative to the lecture approach. Students' achievement was comparable.

Ach, Alg, Curr (PS)

Gannon, Mary Grace. (1999). *Computer-generated versus learner-generated feedback in solving mathematics problems.*(Arizona State University). DAI-A 60/03, p. 646, Sep 1999. [AAT 9923866]

Two computer-based versions of an instructional program on dividing fractions were administered to two groups of students. Problem mastery in the instructional program was significantly higher for the computer-generated feedback group. However, neither method is consistently effective across learners and learning tasks.

CAI, PS, Frac, Lrnr (Not Given)

Geiser, William F. (1998). *Effects of learning-style awareness and responsive study strategies on achievement in, incidence of study of, and attitude toward mathematics of suburban eighth-grade students.*(St. John's University (New York)). DAI-A 59/07, p. 2405, Jan 1999. [AAT 9839161]

Homework/study skills of multi-ethnic (predominately Hispanic), suburban students (n=130) were examined. Two treatments were given to two different samples (average and below average achievers). Results

indicate that the application of learning style strategies to homework/study skills are more productive than traditional strategies.

Att, Styl, Ach, Ethn (SE)

Geoghegan, Noel. (1998). *Emergent mathematics in a grade-two classroom: A search for complex relationships.*(The University of Oklahoma). DAI-A 59/11, p. 4088, May 1999. [AAT 9911857]

The study explored the interconnectedness, evolution, and creative processes of learning framed through three perspectives: problem-centered learning, constructivism, and positive discipline. Findings reveal the reflexive complementarity of the program based on the three perspectives.

Curr, Lrng (EC)

Gerretson, Helen. (1998). *The effect of a dynamic geometry learning environment on preservice elementary teachers' performance on similarity tasks.*(University of Florida). DAI-A 59/09, p. 3383, Mar 1999. [AAT 9905948]

A pretest-posttest control group design was used. The control group was taught traditionally, the experimental group used Geometer's Sketchpad. Results found the experimental group outperformed the control group.

Geom, Tech, Prsv, Comp (EL, TE)

Gilson, Judith E. (1999). *Mathematics achievement and attitudes: A comparison of eighth-grade females from single-gender independent middle schools and females from coeducational independent middle schools.*(University of San Francisco). DAI-A 60/01, p. 86, Jul 1999. [AAT 9918632]

The effect on mathematics performance and attitudes toward mathematics of middle-school females (n=675) in differing learning environments was examined. Results indicated moderate statistically significant effects favoring single-gender middle schools over coeducational schools.

Gend, Att, Ach, Soc (MS)

Gjertsen, Ann. (1999). *Where have all the girls gone? A study of females' perceptions of math success for female high-school students and implications for leadership, policy, and practice.*(Northern Illinois University). DAI-A 60/04, p. 954, Oct 1999. [AAT 9927705]

This study analyzed perceptions of female students who entered and choose to leave honors mathematics. Confidence in, usefulness of, and gender-specific nature of mathematics were factors in their decision. Recommendations included flexibility in tracking, ability grouping, access to elective and upper-level math courses, and providing female role models.

Ach, Att, Gend, Curr, Grpg (HS)

Gormas, Janice Simonson. (1998). *The centrality of a teacher's professional transformation in the development of mathematical power: A case study of one high school mathematics teacher.*(Michigan State University). DAI-A 59/10, p. 3763, Apr 1999. [AAT 9909310]

Results of this 5 year study describe the changes one teacher made in order to develop in his students "mathematical power" as defined by the National Council of Teachers of Mathematics. Changes included a new understanding of what school mathematics is and recognizing mathematics as a human construction.

Curr, Tchr, Tblf. Tknw (HS, T)

Goss, Martha Alexander. (1998). *Writing to learn: An experiment in calculus.*(The University of Southern Mississippi). DAI-A 59/12, p. 4385, Jun 1999. [AAT 9916028]

Two intact first semester classes participated. The experimental group received a directed writing assignment twice a week, the control group did not. Other variables were held constant (including teacher, text, homework, assignments, etc.). Results revealed no significant differences in achievement, either by class or gender.

Writ, Gend, Calc, Ach (PS)

Goudelock, Clifford Pittman. (1999). *Effect of the use of an internet-based 'problem of the week' on high school geometry student problem-solving achievement and attitudes toward mathematics.*(Montana State University). DAI-A 60/04, p. 996, Oct 1999. [AAT 9927871]

Internet access when solving the 'Problem of the Week' had no effect on student problem-solving achievement. Female students with such access had higher self-concepts than the other females.

Att, Comp, PS, Gend, Geom (HS)

Graham, Joanne Marie. (1998). *Elementary inservice and preservice teachers' perceptions of the current mathematics reform movement.*(University of Toronto (Canada)). DAI-A 59/12, p. 4386, Jun 1999 ISBN: 0-612-35401-6. [AAT NQ35401]

A survey was used with about 400 inservice and 200 preservice teachers to determine knowledge and beliefs concerning reform and differences in the groups' beliefs. Results suggest that the majority of both groups' professional positions are aligned with reforms, but in reality both are not very knowledgeable about reform.

Curr, TKnw, TBlf, Tchg (EL, TE, T)

Gray, Susan S. (1999). *College students' symbolic modeling of linear functional relationships presented in prose and tabular forms.*(Boston University). DAI-A 60/03, p. 679, Sep 1999. [AAT 9923947]

For all numerical structures, college students were significantly more successful constructing symbolic models for tabular forms than they were for the prose form. The most successful forms of presentation included both prose and tables, especially for non-unit rate functional relationships.

Alg, Patt, Rep (PS)

Green, Samuel David. (1998). *Block versus traditional scheduled algebra: There is no difference.*(Tennessee State University). DAI-A 59/09, p. 3303, Mar 1999. [AAT 9907845]

The effects on achievement by comparing block-scheduled (n=200) and traditionally scheduled (n=176) ninth-grade algebra students was examined using a pretest-posttest control group design. There was no significant difference in achievement.

Grpg, Alg, Ach (SE)

Gregg, Paula Ann. (1998). *Attitudes toward mathematics and knowledge of mathematical concepts of preservice elementary, early childhood, and special education teachers.*(Clemson University). DAI-A 60/04, p. 1055, Oct 1999. [AAT 9926601]

Fifteen education students participated. Results of the attitude test show that students tended to improve their attitudes toward mathematics when taught by instructors who model appropriate strategies. Results of the achievement test indicated that students are weak in mathematical content.

TAtt, TKnw, Prsv, PS, TAnx (TE/EL)

Gross, Monika Elli. (1999). *A survey of faculty attitudes toward teaching students in developmental courses at four-year institutions in the state of Maryland.*(The George Washington University). DAI-A 60/05, p. 1471, Nov 1999. [AAT 9932075]

Attitudes and backgrounds of (n=226) faculty members were studied. Their overall attitudes were negative citing behavioral, attitudinal, and responsibility problems in developmental students. Females tended to have more positive attitudes than did males, as did instructors and lecturers versus professors of various levels.

Tatt, D/R, Gend (T/PS)

Grunow, Jodean Emilyn Mathison. (1998). *Using concept maps in a professional development program to assess and enhance teachers' understanding of rational number.*(The University of Wisconsin - Madison). DAI-A 60/03, p. 636, Sep 1999. [AAT 9910421]

Teachers participating in a two-week program attained proficiency in understanding rational numbers. Concept maps were found to be valid and reliable measures of assessment.

TKnw, Insv, Frac, Assm, Matl (T)

Haas, Sally Marie. (1998). *A comparison of fraction concept development in selected junior college students and young learners.*(Texas A&M University). DAI-A 59/08, p. 2835, Feb 1999. [AAT 9903127]

The same curriculum and manipulatives were used in the study of college students and third graders. When using manipulatives, college students were more frustrated than third graders. Implications support the use of manipulatives to help young students build understanding and to help the adult learners bridge gaps and correct misconceptions.

Manp, Frac, Tchg (ALL)

Hall, Alfred L., Ii. (1999). *Factors affecting the matriculation of African American undergraduate students in science, mathematics, engineering, and technology.*(George Mason University). DAI-A 60/03, p. 670, Sep 1999. [AAT 9921969]

Undergraduate African American students of science, mathematics, engineering, and technology participating in the Alliance for Minority Participation from six southeastern states completed a questionnaire. Attitudes and beliefs of students attending historically black institutions differed from those attending majority white institutions in terms of goals, stress level, prior preparation, and faculty.

Att, Blf, Ethn, Ach (PS)

Han, Yi Annie. (1998). *Chinese and English mathematics language: The relation between linguistic clarity and mathematics performance.*(Columbia University Teachers College). DAI-A 59/07, p. 2405, Jan 1999. [AAT 9839075]

Relative clarity of terms was judged by a panel of experts. Three junior high populations were examined: English speakers, Chinese speakers, and bilingual English/Chinese speakers. Findings establish the languages express mathematical ideas differently. Interpretation asserts clarity of Chinese terms positively impact achievement of all Chinese-speaking students.

Ethn, Lang, Comm (K-12)

Handley, Stephen Lewis. (1998). *Differences in student achievement between secondary students who received algebra I instruction during a traditional class period and those who received algebra I instruction during an extended time block class period.*(The University of Southern Mississippi). DAI-A 60/01, p. 32, Jul 1999. [AAT 9916030]

The difference in achievement between students (n=274) with traditional algebra I instruction and those with a non-traditional class schedule was examined. Results of the study indicated showed no significant difference in scores between students placed in non-traditional classes and those placed in traditional classes.

Curr, Lrng, Alg (HS)

Hannigan, Mary Kathleen Arthur. (1998). *Exploration of an instructional strategy to promote explicit understanding of place value concepts in prospective elementary teachers.*(The University of Texas at Austin). DAI-A 59/09, p. 3384, Mar 1999. [AAT 9905747]

The study evaluated preservice teachers' place value understanding in a constructivist classroom. Results indicate that preservice teachers improved their global understanding of place value, but their level of understanding was not considered explicit understanding.

Prsv, PlcV, Curr (El, TE)

Harpster, David Lynn. (1999). *A study of possible factors that influence the construction of teacher-made problems that assess higher- order thinking skills.*(Montana State University). DAI-A 60/04, p. 1055, Oct 1999. [AAT 9927881]

Questionnaires were sent to (n=220) public high school mathematics teachers. Professional development, college measurement courses, and continuing education do not seem to impact teachers' assessment of higher-order thinking skills; furthermore, teaching experience alone, without proper training and classroom support, will not improve this situation.

Assm, Insv, TKnw (T/HS)

Hauger, Garnet Smith. (1998). *High school and college students' knowledge of rate of change.*(Michigan State University). DAI-A 59/10, p. 3734, Apr 1999. [AAT 9909315]

Precalculus (n=12), calculus (n=15), and post calculus (n=10) students solved rate-of-change tasks in individual audio and video taped interviews. Written work and verbal explanations were used to identify strategies used to solve the problems. Differences were found in types of knowledge each group possessed.

Calc, Knw, Alg (HS, PS)

Havill, Dale Eric. (1998). *Traditional and nontraditional probability contexts: The role of instruction-related intuitions and everyday intuitions in students' reasoning about sequences of events.*(University of California, Santa Barbara). DAI-A 59/07, p. 2342, Jan 1999. [AAT 9838427]

The study examined characteristics underlying difficulties with understanding the distribution of probabilities associated with ordered sequences of independent events. Results suggest that instruction-related intuitions may mislead experienced students and that cognitive heuristics follow different patterns or do not transfer to alternative problem types or contexts.

Prob, PS, Lrng (PS)

Hawkins, Mary Christie. (1998). *A causal model of teacher influence on mathematical self-concept among college freshmen.*(Oklahoma State University). DAI-A 60/02, p. 371, Aug 1999. [AAT 9918795]

The effect of factors such as gender, number of mathematics classes taken in high school, perceived usefulness of mathematics, interest in mathematics, and mathematics achievement, on college freshmen mathematics self-concept was evaluated. The only factors with direct effects on mathematics self-concept were interest in mathematics, and mathematics achievement.

Att, Ach, Aff, Gend (PS)

Heinrich, Eric John. (1998). *Characteristics and skills exhibited by middle school students in performing the task of computational estimation.*(Fordham University). DAI-A 59/07, p. 2405, Jan 1999. [AAT 9839507]

Pretest, posttest, and four unit tests were used with sixth, seventh, and eighth graders (n=66). Significant differences were found among grade groups on the pretest and unit tests for reformulation, translation,

and compensation strategies. No differences were found on front-end rounding or the posttest. Compensation needs attention in research and instruction.

Est, Arth (MS)

Hendricks, Deborah Joan. (1999). *The use of propositional structures and subgoals in solving multi-step college statistical word and formula problems.*(West Virginia University). DAI-A 60/06, p. 1903, Dec 1999. [AAT 9926694]

This dissertation was a study of the effect of size and format of instructions on number of errors committed and amount of time required to complete a problem. Formula conditions required more time than word conditions. There was a correlation between perceived difficulty of a problem and the number of errors committed.

Blf, PS, Stat, Ach (PS)

Herbst, Patricio Guillermo. (1998). *What works as proof in the mathematics class.*(University of Georgia). DAI-A 59/10, p. 3764, Apr 1999. [AAT 9908601]

This study examined ways to describe and explain how teachers (n=8) and students negotiate the validity of knowledge in the high school classroom. Nine validation practices were differentiated: generic example, isolated example, crucial experiment, ostension, pseudo mathematical justification, metaphor, symmetry, symbolic calculation, and official proof.

Knw, Blf, TBlf, Comm (HS)

Hernandez, Barbara Lorraine Michiels. (1999). *The effect of cumulative grade point average and Texas academic skills program test scores on EXCET professional development test scores in undergraduate education majors at Texas Wesleyan University.*(Texas Woman's University). DAI-A 60/06, p. 1932, Dec 1999. [AAT 9932887]

GPA was a statistically significant predictor for the elementary and secondary level examination for certification. TASP was a statistically significant predictor for elementary level. It is recommended that these variables be combined for use as criteria for admissions, certification, and remediation of teacher candidates in education programs.

Assm, TKnw, Prsv, Ach (TE)

Hernandez, Celeste Peyton. (1999). *Effects of instructional methods on student performance in postsecondary developmental mathematics.*(University of North Texas). DAI-A 60/06, p. 1933, Dec 1999. [AAT 9934663]

Success rates for students (n=10,095) enrolled in developmental and college algebra courses under traditional lecture, laboratory, or computer mediated learning were analyzed. Sequence of methods was significant. Students having lecture developmental algebra then lecture college algebra had the highest grade average; students having laboratory then computer mediated learning performed second highest.

Alg, CAI, Tchg (PS)

Hill, Antwanette Norbert. (1999). *Examining the effects of school climate, student background, teacher expectations, and school-community integration on academic achievement among high poverty urban schools.*(University of Houston). DAI-A 60/04, p. 1018, Oct 1999. [AAT 9929275]

The study provides a clearer understanding of the nature of school practices and policies that impact the variation of student performance in high poverty urban schools.

Ethn, Soc, Tatt (EL)

Hines, Mary Ellen. (1998). *Analysis of processes used by middle-school students to interpret functions embedded in dynamic physical models and represented in tables, equations, and graphs.*(Northern Illinois University). DAI-A 59/09, p. 3384, Mar 1999. [AAT 9906425]

The study incorporated a slack rope board and spool elevating system for students to explore. Students identified variables and generated tables, graphs, and equations. Results found students able to focus on underlying concepts and transferring knowledge of functions in one representation to another representation.

Rep, Patt, Alg (MS)

Hofstetter, Carolyn Huie. (1998). *Toward an equitable NAEP for English language learners: What contextual factors affect math performance?*(University of California, Los Angeles). DAI-A 59/09, p. 3418, Mar 1999. [AAT 9906793]

Participants were predominately Hispanic, eighth grade English language learners. Findings suggest that lower-level students benefit when the language of the test matches the language of mathematics instruction. Higher-level students benefit from an extra time accommodation. However, all effects were nominal and no single test accommodation benefits all students.

Assm, Ethn, Lang (MS)

Hogan, Judith Ann Sockey. (1999). *The alternate-calendar and how it affects student reading and math achievement and reading attitudes.*(University of Arkansas). DAI-A 60/06, p. 1963, Dec 1999. [AAT 9932754]

An alternate-calendar schedule appears to help students grow in reading and mathematics compared to a traditional calendar. There are advantages with discipline, attendance, curriculum continuity, learning retention, reading attitudes, community involvement, and stress. Disadvantages involved schedule conflicts. It should be noted that the group was not randomly selected.

Att, Curr, Soc, TAtt (K-12)

Hogan-Gancarz, Catherine R. (1998). *Working memory and mathematics: Cognitive learning strategies use with students with learning disabilities.*(New Mexico State University). DAI-A 59/08, p. 2924, Feb 1999. [AAT 9901748]

One group received memory strategy instruction for 6 weeks along with an individualized mathematics program. Pretests, midtests, and posttests were administered. Results indicate that the treatment group performed significantly better than a comparison group that did not receive memory strategy instruction along with their individualized mathematics program (n=29).

LD, Lrng (K-12)

Huang, Chiu-Hsia. (1998). *Factors that predict success as measured by a final score in a fast-paced-math program for gifted high shool students.*(Arizona State University). DAI-A 59/10, p. 3726, Apr 1999. [AAT 9910302]

Various eligibility criteria as predictors of success in Fast-Paced-Math (FPM) programs were examined. One criterion, the Pre-Fast-Paced-Math Test score emerged as a good predictor of success in FPM (n=28).

Gift, Assm (HS)

Hurley, Marlene M. (1999). *Interdisciplinary mathematics and science: Characteristics, forms, and related effect sizes for student achievement and affective outcomes.*(State University of New York at Albany). DAI-A 60/04, p. 997, Oct 1999. [AAT 9927626]

Interdisciplinarity is examined on philosophic and pedagogic levels. Student improvement in thinking skills was noted. Teachers, administrators, and teacher education are important to the success of interdisciplinary program.

Curr, Int, Tchg (ALL)

Idris, Noraini. (1998). *Spatial visualization, field dependence/independence, van Hiele level, and achievement in geometry: The influence of selected activities for middle school students.*(The Ohio State University). DAI-A 59/08, p. 2894, Feb 1999. [AAT 9900847]

One experimental and one control class from grades 6, 7, and 8 were studied. Activities for the experimental group were designed to help students visualize constructions, relate properties, and extract simple geometric figures from complex designs. Experimental activities increased geometry achievement and each cognitive variable tested.

Geom, Lrng, Ach (MS)

Isley, Linda Shoffner. (1998). *A study of subsequent mathematical outcomes for students taught algebra I using algebra I: A process approach.*(North Carolina State University). DAI-A 59/10, p. 3764, Apr 1999. [AAT 9909476]

Algebra I: A Process Approach employs a process instructional approach which is purported to develop inquiry and problem solving skills and internalize algebraic ideas. Results comparing subsequent student performance in Geometry and Algebra II with traditionally instructed students' performance found no significant differences (n=357).

Alg, Curr, Ach, Geom (HS)

Izsak, Andrew Gyula. (1999). *Inscribing the winch: A case study of two students constructing knowledge for representing the physical world with algebra.*(University of California, Berkeley). DAI-A 60/05, p. 1490, Nov 1999. [AAT 9931274]

Eighth grade algebra students were studied. By proposing an explanation for how students learn to model, this dissertation contributes to our understanding how knowledge fundamental to mathematics cognition develops.

Alg, Knw, Rep, PS (PS)

Jacobs, Jennifer K. (1999). *Assessing teachers' beliefs: Japanese and American teachers' evaluations of videotaped mathematics lessons.*(University of California, Los Angeles). DAI-A 60/01, p. 65, Jul 1999. [AAT 9917249]

A sample of American and Japanese teachers were shown mathematics lessons depicting very different instructional approaches. The results suggest that American teachers may have more culturally sanctioned options for teaching an elementary school mathematics lesson, and Japanese teachers have more

fully developed beliefs that support their dominant instructional pattern.

CC, TBlf, Tchg, Lrng (EL, T)

Jean, John Invy. (1998). *Relationship between degree of bilingualism and mathematical word problem solving.*(Columbia University). DAI-A 59/07, p. 2405, Jan 1999. [AAT 9838952]

The study examined seventh (n=70) and eighth (n=55) grade students to determine the extent to which bilingualism influenced reversal errors on compare word problems. Results suggest that balanced bilingual students were less likely than Haitian-dominant or English-dominant bilingual students to generate reversal errors.

Ethn, PS, Lang (MS)

Jean, John Invy. (1999). *Effects of mastery of language symmetry, problem language consistency, and mathematical operation on student's reversal errors in arithmetical word problems.*(Columbia University Teachers College). DAI-A 60/03, p. 715, Sep 1999. [AAT 9921388]

Eighth grade students (n=100) were assessed and grouped into three categories of mastery of language symmetry. Students in lower categories committed more reversal errors in problem solving.

PS (MS)

Johar, Raida. (1999). *Mathematics stories: The effect of instructional context on the mathematical understanding of young children.*(University of Houston). DAI-A 60/04, p. 1018, Oct 1999. [AAT 9929276]

Mathematical understanding of kindergarten children (n=128) taught under traditional instruction was compared to that of children presented with math through story telling. The study concluded that mathematical story instruction did help children and encourage teachers to present material in meaningful, relevant manners.

Att, Knw, Tchg (EC)

Johnson, Erica Lee. (1998). *Graduate teaching assistants' beliefs about teaching mathematics.*(The University of Nebraska - Lincoln). DAI-A 59/08, p. 2895, Feb 1999. [AAT 9903770]

Graduate teaching assistants' (GTA's; n=71) beliefs and attitudes toward pedagogical issues were explored. Student achievement was related to GTAs' sense of status of current education and inversely related to GTA's external efficacy. Other relationships were found among reported task frequency, GTA confidence, internal efficacy, instructional efficacy, GTA gender and other variables.

TBlf, TAtt, Tchr, Gend, Ach (PS)

Johnson, Jeanette Diecidue. (1998). *Perceived retention factors of second-career educators from the military and aerospace.*(University of Southern California). DAI-A 60/05, p. 1516, Nov 1999. [AAT 9931872]

Second-career educators (n=73) were surveyed with respect to perceived retention factors. Research indicates continued ongoing support, encouragement, and communication are necessary.

Insv, Tknw (T)

Johnson, Nancy Raye. (1998). *A descriptive study of number sense and related misconceptions about selected rational number concepts exhibited by prospective elementary teachers.*(University of South Florida). DAI-A 59/11, p. 4088, May 1999. [AAT 9911499]

Results suggest pre-service elementary teachers (n=100) have gaps in their rational number understanding, and they rely on the use of algorithms when approaching non-standard or more difficult problems. The misconceptions they exhibit tend to be similar across different representations of rational numbers.

Frac, NSns, Mscn, Rep (EL, TE)

Johnson, Sandra L. Scaffetta. (1999). *The relationship among the cognitive development level, learning style, achievement, and retention of preservice elementary teachers in a content course in mathematics.*(The University of Oklahoma). DAI-A 60/01, p. 86, Jul 1999. [AAT 9918758]

To study teaching strategies, a particular learning style model was used as treatment on the lower achieving group. The traditional group scored higher on the tests than the learning style treatment group. There was no correlation between cognitive development and learning style preference. Retention was not specific to any particular learning style.

Prsv, Tchg, Styl, Lrng (EL, TE)

Johnson, Virginia Mae. (1998). *An investigation of the effects of instructional strategies on conceptual understanding of young children in mathematics.*(University of California, Riverside). DAI-A 59/11, p. 4089, May 1999. [AAT 9913654]

Three strategies for learning place value were studied: manipulation of concrete objects, writing to learn, and

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drill-and-practice. Results suggest that second grade students taught with manipulatives retain and achieve more than students taught with drill-and-practice. Students taught using writing to learn strategies also made higher gains (n=78).

Manp, Writ, PlcV, Curr (EC)

Jones, Su Chin. (1998). *A web-based technology for fostering initiative.*(Michigan State University). DAI-A 60/03, p. 647, Sep 1999. [AAT 9922329]

Analysis was made of student involvement in publishing The Mathematics Chronicles which is based on design principles for promoting initiative, public audience, collaboration, and norms and practices. Student perception of an audience was the strongest factor in promoting initiative.

Att, CAI, Lrng, ' (Not Given)

Kaminski, Linda Rawson Gonzalez. (1999). *Here today and gone tomorrow: The impact of student mobility on learning.*(Harvard University). DAI-A 60/06, p. 1997, Dec 1999. [AAT 9933137]

A longitudinal study of fourth and fifth graders (n=1016) found that children who moved had lower achievement in mathematics before the move, not necessarily after. Mobility may be related to greater gains in problem solving. Students with a high absence rate showed fewer gains in mathematics.

Ach, Ethn, Soc, PS (EL)

Kayona, Frances Ann. (1999). *A factor analysis of K-12 student feedback items and the association of these items to criterion-referenced tests in reading, language arts, and mathematics.*(Iowa State University). DAI-A 60/04, p. 958, Oct 1999. [AAT 9924729]

This study examined student feedback items from four teacher feedback instruments. These items were measured against student achievement scores in reading, language arts, and mathematics to determine which instructional behaviors are associated with high student achievement. Additional items that best reflect exemplary teaching practices were developed and tested.

Ach, Insv, Tchg (TE)

Kehle, Paul Earl. (1998). *An empirical semiotic analysis of abstraction in mathematical modeling.*(Indiana University). DAI-A 60/06, p. 1949, Dec 1999. [AAT 9932664]

The author defines mathematical modeling within the field of mathematics education. Undergraduate students were studied as they worked on a mathematical modeling problem. The dissertation suggests empirical work within classrooms and work focused on individual student's sense making across disciplines.

PS, Rep, Tchg, Patt (PS)

Kelley, Maureen Shields. (1999). *The development and validation of a taxonomy of Calculus I students' misconceptions regarding the derivative and applications of the derivative.*(University of Lowell). DAI-A 60/05, p. 1490, Nov 1999. [AAT 9932807]

A group of 14 community college students was interviewed. Student misconceptions were coded. Prior knowledge errors were highest. Language errors were the next common. High-achieving students made significantly fewer errors than lower-achieving students.

Blf, Calc, Knw (PS)

Kelley, Patricia Lee. (1999). *The constructivist approach used in teaching college level mathematics to liberal arts majors.*(University of Miami). DAI-A 60/06, p. 1949, Dec 1999. [AAT 9934238]

A course in finite mathematics was created and taught using a constructivist model. Neither students in this experimental group nor the traditional class showed a significant difference in anxiety levels. Course evaluations indicate most students found the different teaching technique had a positive impact on learning.

Att, PS, Tchg, Anx (PS)

Kelly, Dana L. (1999). *Interpreting the Third International Mathematics and Science Study (TIMSS) achievement scales using scale anchoring.*(Boston College). DAI-A 60/03, p. 716, Sep 1999. [AAT 9923420]

The scale anchoring method was used to analyze and describe the TIMSS primary and middle school mathematics and science achievement scales. The result is a content-referenced interpretation of the TIMSS scales through which TIMSS achievement results can be better communicated and understood.

Assm, Rsch, Comm (EL)

Kennedy, John Patrick. (1999). *Block scheduling: A case study in systemic change.*(University of Minnesota). DAI-A 60/03, p. 606, Sep 1999. [AAT 9921417]

Students and teachers were very satisfied with the block schedule, although more responsibility was placed on students. Student-based learning and elective courses fared well. However the transition did not serve as an agent of systematic change.

Att, Curr, TAtt (')

Kerr, Richard Day. (1999). *Implementing constructivism to improve the mathematics achievement of inner city third-grade students.*(Loyola University of Chicago). DAI-A 59/12, p. 4351, Jun 1999. [AAT 9913906]

The study addressed improvement of mathematics achievement in an inner-city public school. Outcomes were substantiated through data source and method triangulation in both the cognitive and affective areas. Results indicate an improvement in achievement over former, traditional instruction and found parents, teachers, and students favored the program.

Ach, Lrng, Aff, Soc (EC)

Kim, Sang Lim. (1999). *The effect of music instruction on prekindergartners' mathematics ability.*(University of Houston). DAI-A 60/04, p. 1006, Oct 1999. [AAT 9929277]

Prekindergarteners (n=98) participated in the study. Those in the experimental groups received music instruction twice per week for 20 weeks. The Test of Early Mathematics Ability (TEMA-2) was administered before and after. It was concluded that there is no causal effect of music instruction on mathematical ability.

Curr, Lrng, Patt (EC)

Klassen, Wendy Lynn. (1998). *Teacher, student, and parent perceptions of reporting practices in mathematics: A study at the grade 8 level.*(University of Toronto (Canada)). DAI-A 60/01, p. 59, Jul 1999 ISBN: 0-612-35207-2. [AAT NQ35207]

The perceptions of reporting practices in mathematics by teachers, students and parents (n=8, 24, 24) were examined. The majority of participants were satisfied with the reporting practices used for Grade 8 mathematics and felt comfortable with letter grades.

Assm, Blf (SE)

Krebs, Angela S. (1999). *Students' algebraic understanding: A study of middle grades students' ability to symbolically generalize functions.*(Michigan State University). DAI-A 60/06, p. 1949, Dec 1999. [AAT 9936570]

This study investigates learning of 10 typical eighth grade students in a reform curriculum called Connected Mathematics Project. Students with three years in the program demonstrated deep understanding of algebraic concepts. Teachers can learn much more about students' understanding in algebra by drawing on multiple sources of evidence.

Alg, Curr, Patt, Assm (MS)

Krenicki, Christine. (1999). *The relationship of mobility to student achievement for those eighth-grade regular students who are required to take the New Jersey Early Warning Test (EWT).*(Seton Hall University, College of Education And Human Services). DAI-A 60/05, p. 1525, Nov 1999. [AAT 9933307]

A mobility questionnaire was developed and completed by parents of eighth grade students who took the Early Warning Test. Findings indicate statistical significance.

Ach, Soc, Ethn (MS)

Kuchler, James M. (1998). *The effectiveness of using computers to teach secondary school mathematics: A meta-analysis.*(University of Lowell). DAI-A 59/10, p. 3764, Apr 1999. [AAT 9910293]

A meta-analysis of 65 studies investigated the use of computer-assisted instruction (CAI). Results suggest that CAI has a small positive effect on mathematics' achievement and a possible medium impact on retention. CAI is most effective for drill and practice or with the use of combinations of modes and when used to supplement regular instruction.

CAI, Revw, Tchg (SE)

Lachance, Andrea Marie. (1999). *Promoting reform in mathematics education by building content knowledge, technological skills, and teacher community.*(Cornell University). DAI-A 59/12, p. 4386, Jun 1999. [AAT 9914649]

Working with various stakeholders, a two-week professional development course for an inner-city school was designed and implemented to determine how professional development contributes to systemic reform. Results indicate an increase in reflection and thinking skills, greater use of technology in class, and development of a stronger teaching community.

Insv, TKnw, Tech, Mtcg (HS)

Lanier, Susie Mae. (1999). *Students' understanding of linear modeling in a college mathematical modeling course.*(University of Georgia). DAI-A 60/05, p. 1490, Nov 1999. [AAT 9928955]

Students used a spreadsheet template to model population data. Schoenfeld's framework for exploring mathematical cognition was used to examine students' thinking and problem solving. Students were procedurally correct, although they relied heavily on the spreadsheet. Life experiences influenced their interpretations. Ideas were communicated adequately.

Patt, PS, Rep, Comm (PS)

Larew, Lalah W. (1999). *The effects of learning geometry using a computer-generated automatic draw tool on the levels of reasoning of college developmental students*.(West Virginia University). DAI-A 60/06, p. 1890, Dec 1999. [AAT 9926702]

The cognitive growth of college developmental geometry students enrolled in a one-semester course in introductory Euclidean Geometry was investigated. The experimental group using the draw tool (n=27) and the control group used traditional lecture(n=36). The experimental group mean increase was not significantly greater than the increase for the control group.

CAI, Geom, Tchg, Comp, Curr, Lrng (PS)

Larriva, Cesar Martin. (1998). *A situated view of participation in a high school mathematics classroom*.(Stanford University). DAI-A 59/10, p. 3764, Apr 1999. [AAT 9908801]

The study investigated aspects of the classroom learning of two female students . Interpersonal and mathematical aspects of participation were explored from analyses of three extended episodes of videotaped student interactions, observation of class activity, and teacher interviews. Findings suggest that participation structures can favor some and disadvantage other students.

Lrng, Gend, Comm, Tchg, Pers (HS)

Laudien, Renate Christine. (1998). *Mathematical reasoning in middle school curriculum materials*.(University of Delaware). DAI-A 59/09, p. 3384, Mar 1999. [AAT 9906854]

Seventh and eighth grade textbooks of two commercial and two experimental series were analyzed to determine how they presented justifications and how often students were required to use logical reasoning. Results show differences between the series and an increasing emphasis on deductive reasoning from seventh to eighth grade texts.

Matl, Curr, Prf, PS (MS)

Lees, Jimmy Dee. (1998). *The effect of a constructivist teaching strategy on students' understanding of variable*.(University of Wyoming). DAI-A 60/01, p. 86, Jul 1999. [AAT 9915773]

A quasi-experimental study was undertaken comparing a constructivist teaching strategy to a traditional didactic approach of mathematics instruction in teaching the concept of variable. No significant effect of a constructivist teaching strategy on students' (n=84) understanding of variable was found.

Lrng, Aeh, Alg (PS)

Letshabo, Kathleen M. (1998). *Explaining differential item functioning in mathematics performance assessments*.(University of Pittsburgh). DAI-A 59/09, p. 3419, Mar 1999. [AAT 9906253]

The goal of the study was to identify instructional and test development dimensions that minimize differential item functioning in assessment tasks based on gender in middle school (n=15). Results revealed gender-related differentiated patterns in student organization and interpretation of information, and selection, execution, and justification of strategies.

Gend, Assm, Lrnr (MS)

Levin, Suzanne W. (1998). *Fractions and division: researcher conceptualizations, textbook presentations, and student performances*.(The University of Chicago). DAI-A 59/11, p. 4089, May 1999. [AAT 9910890]

The study found that there is no consensus among researchers on a single conceptualization for either fractions or division, and that few connections between fractions and division are made. Also, researchers do not address symbolism or vocabulary. Textbooks reflected this lack of consensus, and student performance did not reflect textbook presentation.

Frac, M/D, Revw, Matl (EL)

Li, Bey-Bey. (1998). *Understanding the nature of epistemic discourse in middle-grade mathematics classrooms*.(Washington State University). DAI-A 60/01, p. 86, Jul 1999. [AAT 9917432]

A framework that could be used to examine discourse in mathematics lessons and help teachers structure whole-class discourse in middle-grade mathematics classrooms was developed. Three components constituted the framework: (a) make explicit distinctions and connections among mathematical concepts, (b) keep mathematical ideas alive, and (c) explicitly negotiate mathematical meaning.

Oral, Tchg (MS)

Little, Elliston Oliver. (1998). *Collaborative learning and the social facilitation theory in basic actuarial mathematics*.(Columbia University Teachers College). DAI-A 59/10, p. 3765, Apr 1999. [AAT 9909423]

Collaborative and non-collaborative groups had nonsignificant differences in group mean scores after the first two topics. Three correlates of attitude to collaborative learning, interaction anxiety, mathematical ability, and locus of control were investigated. Results of tests taken in close proximity to fellow group members or separated from group members were compared to theory..

Grpg, Soc, Att, Anx, Lrng, AdvM (PS)

Lomax, George Dan. (1999). *A case study of a first-year teacher's development of pedagogical content knowledge regarding mathematics instruction within a mentoring relationship.*(Auburn University). DAI-A 60/05, p. 1517, Nov 1999. [AAT 9931102]

Pedagogical content knowledge, the interrelated knowledge of content, pedagogy, and student needs provided the theoretical lens for this year-long case study. The results indicate that a mentor plays a significant and important role in a first-year teacher's professional development.

TKnw, Tchg, Insv, Prsv (T, TE)

Long, Kimberly Elizabeth. (1998). *Statistics in the high school mathematics curriculum: Is the curriculum preparing students to be quantitatively literate?*(The American University). DAI-A 60/01, p. 87, Jul 1999. [AAT 9917497]

The American Statistical Association (ASA) and NCTM joint committee on statistics education wanted particular emphasis on probability and statistics topics in the mathematics curriculum, not just isolated topics haphazardly integrated into existing mathematics courses. This study examines the progress made in this area.

Stat, Prob, Curr (HS)

Long, Nancy Lee. (1998). *Pathways to mathematical excellence: An international perspective.*(The University of Southern Mississippi). DAI-A 60/01, p. 87, Jul 1999. [AAT 9916036]

The problem of highly capable youth experiencing boredom in mathematics classes was studied. Suggested solutions were AP courses, dual enrollment, and fast-paced residential schools. A comparison between students at Princeton and Oxford was also undertaken. Analysis showed that Princeton students spent a smaller percentage of their course load in mathematics classes.

Gift, CC (HS, PS)

Long, Robert Terrelle. (1998). *Pathways to mathematical excellence: A national perspective.*(The University of Southern Mississippi). DAI-A 60/01, p. 87, Jul 1999. [AAT 9916037]

To respond to issues of placement, enrichment, and burnout, students (n=185) in schools of science and mathematics, highly competitive boarding schools, and early college entrance programs were studied. Findings suggest that precocious mathematics students thrive in residential schools which meet student needs of acceleration and advanced mathematics course offerings.

Gift (HS)

Looman, Melinda O. (1998). *Retrospective perceptions of female adolescents whose math/science standardized test scores dropped over their school experience.*(The University of Utah). DAI-A 59/09, p. 3398, Mar 1999. [AAT 9907222]

Respondents' (n=14) scores fell at least 2 deciles from fifth to eleventh grade. Results found respondents believe that females have a second-class status, have fewer opportunities, experience role conflict, have merit related to appearance, have less ability in mathematics and science, receive less attention, and struggle with competition and success.

Aff, Gend, Bif, Att, Soc (K-12)

Lopez, Edward Michael. (1999). *Guidance of Latino high school students in mathematics and career identity development.*(University of California, Santa Cruz). DAI-A 60/03, p. 648, Sep 1999. [AAT 9921934]

This study examines two models of guidance, the Assisted Performance model derived from Sociocultural theory and the Individuation in relation to students' (n=115) mathematics achievement and career identity development. Higher Assisted Performance was related to higher mathematics grades for those in the college-prep track, but to lower mathematics grades for students in the remedial track.

Ethn, CC, Soc, Ach (HS)

Lopp, Annette Louise Baker. (1998). *Faculty definitions of and beliefs about student ability: Are they related to classroom structures, student retention, and student pass rates?*(The University of Oklahoma). DAI-A 59/09, p. 3351, Mar 1999. [AAT 9905617]

Eight mathematics faculty from 2 community colleges were interviewed. Analysis indicated that no common definition for mathematical ability exists, some believe students have ceilings to their ability, faculty

with high retention and pass rates used more activities, and faculty with low retention and pass rates primarily lectured.

TBlf, TAtt, Curr, Tchg (PS)

Loud, Barbara Jean. (1999). *Effects of journal writing on attitudes, beliefs, and achievement of students in a college mathematics course.*(Boston University). DAI-A 60/03, p. 680, Sep 1999. [AAT 9923962]

Beliefs and attitudes about mathematics and the learning of mathematics improved significantly for students in the journal writing sections, but not for those in the non-journal writing section. This study showed that weekly structured complex writing assignments is effective in enabling students to achieve greater success in learning mathematics.

Writ, Att, Blf (PS)

Mabbott, Donald James. (1998). *Developmental change and individual differences in children's multiplicati on.*(University of Alberta (Canada)). DAI-B 59/07, p. 3737, Jan 1999 ISBN: 0-612-29066-2. [AAT NQ29066]

The development of multiplication skill and knowledge in Grade 4 and 6 children (n=60,60) was studied. Some findings were that children use multiple procedures to solve multiplication problems, children use specific procedures on specific types of problems, and variables important for predicting solution latencies change with age.

M/D, Lrng (EC, MS)

Macleod, Lonny George. (1998). *Computers as to OLS in support of learning tenth-grade mathematics story problems.*(The University of Memphis). DAI-A 59/09, p. 3384, Mar 1999. [AAT 9905094]

Computers were used in a cooperative environment. Students used prior knowledge in solving story-problems. High ability males and females performed better when paired with average ability females. Females outperformed males in this environment, as did mixed-gender groups vs. same-gender groups. All participants improved both in performance and behavior in this environment.

Gend, Grpg, Comp (HS)

Mainzer, Karen Lynne Harper. (1999). *The effects of team-based procedural facilitation on the performance of students with mild disabilities.*(The Johns Hopkins University). DAI-A 60/04, p. 1080, Oct 1999. [AAT 9927120]

Students (n=64) with mild disabilities in fourth, fifth, and sixth grades in a cooperative learning environment were compared with and without team-based facilitation. Students in the TeamView group had significantly higher scores in mathematics achievement over time but did not significantly improve the rate of homework completion or class preparedness.

LD, Grpg, Lrng, Ach (EL)

Malouf, Samer George. (1999). *A comparison of problem-centered learning model and guided-practice model on high school students' mathematics performance and attitude.*(University of San Francisco). DAI-A 60/05, p. 1490, Nov 1999. [AAT 9933317]

It was predicted that using problem-centered learning approach would produce better problem-solving students and have a positive effect on attitudes toward mathematics. Comparison of the Interactive Mathematics Program and a teacher-guided approach were compared (n=61) and the findings did not support the hypothesis.

Ach, Att, Tchg, Alg, PS (HS)

Marinas, Carol Ann. (1999). *A study of mathematical concepts in a LOGO environment using mapping activities with education majors of differing cognitive styles.*(The Florida State University). DAI-A 60/03, p. 680, Sep 1999. [AAT 9922663]

The purpose was to determine the effects of field-independence and spatial abilities on problem-solving methods in a Logo environment. Four Elementary Education majors with differing cognitive abilities were observed solving computer mapping tasks. Participants with high field-independent and spatial abilities do well with Logo problem solving.

PS, CAI, Styl, Prsv (EL, TE)

Martin, Belvia Kibler. (1998). *Mathematical self-perceptions of African American children: One school interprets the NCTM standards.*(Cleveland State University). DAI-A 60/04, p. 1000, Oct 1999. [AAT 9928632]

The hypothesis is that poor performance is partly due to negative perceptions many African-American students have about themselves as mathematicians. This study examines how four African-American students experience mathematical learning and what effects these experience have on their self-perceptions as mathematicians.

Ethn, Att, Curr, Lrng, Aff (K-12)

Matos, Jose Manuel Leonardo De. (1999). *Cognitive models for the concept of angle.*(University of Georgia). DAI-A 60/05, p. 1491, Nov 1999. [AAT 9928965]

The cognitive models of Lakoff and Johnson were contrasted with the van Hiele theory of cognition when fourth and fifth graders (n=16) were studying the geometric concept of angle. The study demonstrated the value of categorization theory in understanding how comprehension of mathematics is rooted in basic human experiences.

Geom, Rep, Lrng, Impl, Phil (EL)

Matthews, Nancy L. Ott. (1998). *A comparison of traditional and reform styles in teaching applied calculus.*(The University of Oklahoma). DAI-A 59/07, p. 2406, Jan 1999. [AAT 9839790]

The experimental class used a reform textbook, graphing calculators, and small group activities. The traditional class used a traditional text, scientific calculators, and lecture. Experimental students scored higher on conceptual problems, equally on computation, higher on non-routine problems, and better on affect concerning the usefulness of mathematics (n=59).

Curr, Calc, Aff, Grpg, GCal (PS)

Mceneaney, Elizabeth H. (1998). *The transformation of primary school science and mathematics: A cross-national analysis, 1900-1995.*(Stanford University). DAI-A 59/08, p. 3235, Feb 1999. [AAT 9901555]

The study argues that the global rise of the liberal individualist polity results in cultural changes which are reflected in mass educational curricula. Content analysis from 50 nations found science and mathematics texts becoming more participatory in orientation, more culturally accessible, and more human and fun over the course of the twentieth century.

Soc, Matl (EL)

Mcgivney-Burelle, Jean Marie. (1999). *The nature of control in the problem-solving process: A study of Ph.D. mathematicians* (The University of Connecticut). DAI-A 60/04, p. 1056, Oct 1999. [AAT 9926268]

To what extent does domain knowledge, problem-solving skills, and beliefs impact issues of control during problem solving endeavors? Ph.D. mathematicians solved complex problems aloud. Several themes were identified with respect to domain knowledge, problem-solving skills, beliefs, aesthetics and the interaction of these factors with respect to control.

PS, Knw, Mteg, Styl,Lrnr, Rep (PS)

Melillo, Judith Ann. (1999). *An analysis of students' transition from arithmetic to algebraic thinking.*(Kent State University). DAI-A 60/06, p. 1906, Dec 1999. [AAT 9934551]

The researcher built a model of particular seventh grade students' (n=7) mental actions as they moved from arithmetic to algebraic thinking. Algebraic thinking emerged at the third and fourth levels of procedural thinking. The detailed account of increasingly sophisticated thinking is the kind of information critical to instruction in a constructivist environment.

Alg, Lrng, Arth, Mteg (MS)

Melita, Joseph A. (1999). *Writing readable mathematical proofs: An exploratory study.*(The Florida State University). DAI-A 60/03, p. 680, Sep 1999. [AAT 9922664]

This study looks into the ability of authors of mathematics textbooks to present the material in a style which students can understand. Students (n=8) were involved in this research to improve presentation and understanding of theorems and proofs.

Prf, Tchg, Matl, Writ (PS)

Mendez, Edith Prentice. (1998). *Robust mathematical discussion.*(Stanford University). DAI-A 59/10, p. 3765, Apr 1999. [AAT 9908816]

A theoretical construct, Robust Mathematical Discussion (RMD), is explored in an eighth grade class emphasizing discussion and community. Two norms become established for RMD: students must justify answers and there were no quality expectations for justifications. Also, conditions necessary for RMD are continuity to build discussion and the mathematics explored must be significant and challenging.

Comm, Oral (ALL)

Mereckling, Wayne Joseph. (1999). *Relationship(s) between the perceptual preferences of secondary school students and their achievement in functions using a graphing calculator.*(St. John's University (New York)). DAI-A 60/02, p. 371, Aug 1999. [AAT 9918684]

The effect of graphing calculators on attitude and achievement in mathematics of tactual/visual learners was examined. Results showed that students with a

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tactual/visual preference demonstrated a significantly better working knowledge of the calculator. The attitude and achievement scores of all students using calculators were higher than those of other students.

GCal, Styl, Ach, Att, Alg, Gend (HS)

Merz, Alice Horton. (1999). *Making sense of the moment: The essences and improvisational nature of teaching fifth-grade mathematics.*(University of Northern Colorado). DAI-A 60/04, p. 1020, Oct 1999. [AAT 9927742]

The study examined one teacher's fifth-grade mathematics teaching via her teaching journals, which included some detailed descriptions of classroom events along with her reflections. Five essences of teaching emerged: planning, reflecting, understanding the students' thinking, communicating, and facilitating sense-making. The study became about how the teacher's way of teaching allowed for things like on the spot decisions.

Tchg, Writ, Lrng, Insv (EL, T)

Miller, Daniel Ray. (1999). *Exploring the integration of technology in collegiate mathematics.*(Illinois State University). DAI-A 60/04, p. 1056, Oct 1999. [AAT 9927772]

Based on this research, the Pre-instruction in Technology methodology in a College Algebra course is preferable to an Integrated Technology Instruction methodology for enhancing both students' overall performance and attitudes towards the inclusion of technology in mathematics.

Att, Tech, Alg, IC (PS)

Miller, Georgia Stratton. (1999). *The effect of computer tutorial software as a mode of instruction in intermediate algebra.*(The University of Southern Mississippi). DAI-A 60/06, p. 1950, Dec 1999. [AAT 9935701]

The main points concerning CAI that emerged from the study were the benefits to students of immediate feedback from the computer, the value of interaction with the computer as a means of learning mathematics, and the advantage of individualized instruction. The primary perceived weaknesses of the course were the self-paced format and the lack of academic credit (n=12).

CAI, Styl, Alg (PS)

Miranda, Kathleen. (1999). *An analysis of the aspirations and influences of family, the mathematics classroom, and beliefs about learning mathematics on the mathematics achievement of American high school students: A study using NELS:88 data.*(St. John's University (New York)). DAI-A 60/03, p. 680, Sep 1999. [AAT 9922197]

The same students (n=12,053) were tested three times (grades=8,10,12). The results showed that students who continued taking advanced mathematics shared many of the same attributes: They started advanced mathematics earlier, they spent more time doing mathematics homework, they were willing to ask challenging questions, and they recognized the utility of mathematics.

Blf, Soc, Ach, PS (SE)

Mitchell, Karen E. (1999). *The effect of postorganizers on mathematics achievement following lectures.*(West Virginia University). DAI-A 60/06, p. 1891, Dec 1999. [AAT 9926705]

Intermediate algebra students either completed the written postorganizer after each lecture or took a quiz over the same lecture. The postorganizer emphasized student-developed explanations rather than procedures. The results were most promising, showing the group of students in the experimental group with the highest exposure to the postorganizer had the greatest improvement.

Writ, Lrng (PS)

Mitchell, Mary Suzanne. (1998). *Relationships among teachers' perceptions of principal leadership, the mathematics attitude of the elementary principal, and participation in the Arkansas K-4 crusade.*(University of Missouri - Kansas City). DAI-A 60/03, p. 608, Sep 1999. [AAT 9918051]

The data suggest that a relationship does not exist between the teachers' (n=813) perception of the leadership of the principal (n=62) in mathematics education and the principal's mathematics attitude. There is a relationship between the teachers' perception of the leadership provided and the principal's participation in the Arkansas K-4 Crusade.

TAtt, Tchr, Curr (T)

Mooney, Edward S. (1999). *Development of a middle school statistical thinking framework.*(Illinois State University). DAI-A 60/04, p. 1056, Oct 1999. [AAT 9927773]

The purpose of this study was to develop and validate a framework for describing middle school students (n=12) thinking across four constructs: describing data, organizing and reducing data, representing data, and analyzing and interpreting data. Results indicate

that students use statistical intuition-on informal intuitive reasoning used in applying statistics within various contexts.

Stat, Plan, Curr (MS)

Moyer, Patricia Seray. (1998). *Using mathematics manipulatives: Control- versus autonomy-oriented middle grades teachers.*(The University of North Carolina at Chapel Hill). DAI-A 59/07, p. 2406, Jan 1999. [AAT 9840965]

Results of the study indicate that a teacher's control orientation impacts their use of manipulatives. Also, students of control-oriented teachers become more intrinsically motivated while students of autonomy-oriented teachers become more extrinsically motivated.

Manp, Tchr, Att (MS)

Murdock, Stephen Kent. (1999). *Secondary mathematics teacher education programs in Iowa.*(The University of Iowa). DAI-A 60/06, p. 1950, Dec 1999. [AAT 9933399]

All Iowa colleges and universities offering mathematics teacher education programs were surveyed, and 24 responded (response rate=89%). The typical mathematics education program in Iowa had about one faculty member per 10 graduates with fewer than one-third of the faculty holding a degree in the field of mathematics education.

Curr, Prsv (TE)

Murphy, Lauren Anne-Frances. (1998). *Learning and affective issues among higher- and lower-achieving third-graders in math reform classrooms: Perspectives of children, parents, and teachers.*(Northwestern University). DAI-A 59/12, p. 4358, Jun 1999. [AAT 9913852]

Three heterogeneous third-grade classrooms were studied. Differences were found among lower-, middle-, and higher-achieving students in areas such as participation, mathematics anxiety, self-esteem, and self-confidence in mathematics. All of the lower-achieving students were of minority groups and most were of lower socioeconomic backgrounds.

Curr, A/S, Anx, Ethn, Eqty, Soc (EC)

Muter, Ethel M. (1999). *The development of student ideas in combinatorics and proof: A six year study.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/03, p. 681, Sep 1999. [AAT 9922481]

This research examined the nature of the representations built, the process by which solutions and justifications are built, and the extent to which the students build on ideas previously built as they begin to develop mathematical proofs. Children (n=5) built strong arguments at an early age and these arguments were durable over time.

Rep, Prf, Lrng (SE)

Naylor, Michael Edward. (1999). *Children's mathematizing in a computer number space.*(The Florida State University). DAI-A 60/03, p. 681, Sep 1999. [AAT 9923692]

This study examines children's (n=4) mathematizing while engaged in a computer activity, focusing on their unitizing activity while constructing decimal and geometric units of length. The study has implications for designing learning environments, for cognitive research, teacher learning, assessment, and research methodology.

Lrng, CAI, PS, Decm, Geom (MS)

Nelson, Rebecca Sue. (1997). *Developing mathematical knowledge through class discussion: One teacher's struggles in implementing reform.*(Virginia Polytechnic Institute And State University). DAI-A 60/03, p. 681, Sep 1999. [AAT 9917302]

The case study examines the experience of one secondary mathematics teacher during efforts to facilitate mathematical discussions in a secondary algebra class. The teacher struggled with three main issues: classroom challenges, perceptions of student resistance, and teacher authority. Even teachers with grounded knowledge in current reform initiatives need strategies for facilitating a standards-like environment.

Curr, Oral, Tchg, Prsv,Insv, TBlf (HS, T)

Nettles, Harriet. (1999). *Motivational factors related to performance in college-level mathematics classes: An investigation of gender differences.*(University of South Carolina). DAI-A 60/04, p. 1013, Oct 1999. [AAT 9928332]

The purpose was to investigate the relationship among the motivational variables of causal attributions, expectancies, and students' concept of mathematics ability as entity or incremental and performance in mathematics classes (n=205) and to determine which combination of the variables best predicted differences between high and low achievers. Males and females differed significantly on the motivational variables.

Gend, Aff, Soc (PS)

Nigam, Preety. (1998). *The role of visualization in teaching undergraduate mathematics: A multicase study of teachers' perceptions and practices.*(Syracuse University). DAI-A 59/07, p. 2406, Jan 1999. [AAT 9842404]

The study examined the role of visual strategies in teaching calculus from the instructor's perspective. The researcher identified 4 primary visual teaching strategies which instructors use, often blending them into one teaching episode.

Calc, Vis, Tchg (PS)

Nisbett, Claudia Jackson. (1999). *The effect of cross-age peer tutoring on mathematical achievement and self-esteem of elementary school children.*(Delta State University). DAI-A 60/06, p. 1912, Dec 1999. [AAT 9932940]

This research concentrated on the effectiveness of a cross-age peer tutoring program in hopes to improve on the concept of place value of third grade tutees (n=36) and to improve the concept of place value with fifth and sixth grade tutors (n=37). Findings indicated cross-age peer tutoring did not significantly increase mathematical achievement of concepts of place value.

Arth, PlcV, Soc, Ach, NSns (EL)

Noguera, Norma A. (1998). *A description of tenth-grade students' attitudes and cognitive development when learning algebra using symbolic manipulators.*(Ohio University). DAI-A 59/07, p. 2406, Jan 1999. [AAT 9841660]

The sample of the study consisted of 6 females from a class of 28. They experienced a positive change in attitudes with improvement in motivation, self-confidence, and frustration level. Also, students improved their conceptual understandings, including their ability to solve problems, their mathematical vocabulary use, and their communication skills.

Alg, GCal, Att, Gend, Lrng (HS)

Nussbaum, Sheryle. (1998). *The changing beliefs and practices of six new mathematics teachers.*(University of Louisville). DAI-A 59/07, p. 2453, Jan 1999. [AAT 9839312]

The study involved preservice teachers in an innovative education program. Their beliefs changed most during student teaching. As they found success replacing traditional strategies with constructivist strategies, they changed their beliefs that children fail to learn due to lack of ability to recognize the effect of inappropriate or unsuitable teaching strategies.

Prsv, TBlf, Curr, Lrng (TE)

O'leary, Michael. (1999). *The validity and consistency of findings across international studies of mathematics and science achievement: A comparison of outcomes from IAEP2 and TIMSS.*(Boston College). DAI-A 60/05, p. 1526, Nov 1999. [AAT 9928367]

The study set out to answer: What accounts for the apparent inconsistency of Irish science performance in the two international assessments in Ireland? Analyses led to the conclusion that population definition, test-curriculum overlap and the use of aggregated scales contributed to the differences between the outcomes of the two surveys.

Ethn, Impl, CC (MS)

Omniewski, Rosemary Anne. (1999). *The effects of an arts infusion approach on the mathematics achievement of second-grade students.*(Kent State University). DAI-A 60/05, p. 1389, Nov 1999. [AAT 9933063]

As a result of this study, use of an arts infusion approach was found to be as effective as innovative manipulative or traditional textbook approaches in teaching mathematics, and a significant gain in retention of mathematics concepts occurred through the use of arts infusion (n=49).

Manp, IC, Curr, Vis (EC)

Oquendo-Rodriguez, Aida L.. (1999). *Latina girls of Puerto Rican origin who are successful in science and mathematics high school courses.*(University of Massachusetts). DAI-A 60/02, p. 384, Aug 1999. [AAT 9920636]

The interests, life experiences, characteristics and motivations of Latina girls of Puerto Rican origin who are successful in science and mathematics is examined. Among the findings are that teacher relationships, family expectations, mother's support, mother-daughter relationships and cultural pride contribute to success in school regardless of socioeconomic background.

Ethn, Gend, Soc (HS)

Orazio, Pattiann. (1999). *Effect of matching and mismatching learning style global and traditional analytic instructional resources on the achievement and attitudes of seventh-grade mathematics students.*(St. John's University (New York)). DAI-A 59/12, p. 4386, Jun 1999. [AAT 9914795]

The use of a global instructional format together with global, rather than analytic materials, techniques, and resources allowed students to capitalize on their strengths and bypass their weaknesses. Data revealed partial significance when students were matched

versus mismatched with instructional strategies congruent with their learning-style preferences.

Styl, Att, Ach, Tchg (MS)

Osterhus, Cynthia B. (1998). *Fourth grade teachers' knowledge of multiplication and division of whole numbers within an inquiry based staff development context: A collective case study.*(The University of North Carolina at Greensboro). DAI-A 59/07, p. 2407, Jan 1999. [AAT 9900399]

A case study of three teachers over a 14-week staff development program found that using categories of concrete, computational, and principled conceptual knowledge, teachers' representations began and remained primarily concrete and computational. However, there was evidence of a shift to principled conceptual knowledge.

Insv, TBlf, Tchr, M/D (T, EL)

Patterson, James Charles. (1999). *An historical account of the first year of operation of the Maine school of science and mathematics.*(University of Sarasota). DAI-A 60/01, p. 94, Jul 1999. [AAT 9918628]

The Maine School of Science and Mathematics is a statewide public, residential, charter high school designed for highly motivated and high achieving students from across the state. A comparison was made to a synthesis of characteristics derived from the literature review on the ten public, statewide, residential schools.

Curr, Gift, Soc (HS)

Perez, Kurt Jeffrey. (1998). *Predictors of achievement in math and reading by elementary ESOL and non-ESOL students using a computer-based integrated learning system.*(Barry University School of Education). DAI-A 59/07, p. 2354, Jan 1999. [AAT 9838849]

The performance of ESOL and non-ESOL students (n=750) using a computer based integrated learning system was analyzed in relation to ESOL level, time-on-task, gender, age and socioeconomic status. Time-on-task was shown to be the best predictor of mathematics and reading gains. ESOL level was also a significant factor.

CAI, Ethn, Gend, Soc (EL)

Perry, Becky Vest. (1998). *Algebra I as an eighth-grade course: An examination of attitudes, mathematics anxiety, motivation, and achievement.*(The University of Alabama). DAI-A 60/03, p. 698, Sep 1999. [AAT 9920865]

Affective variables, such as attitudes about mathematics, mathematics anxiety, motivation to do mathematics, and achievement were assessed and compared between Grade 8 algebra I students (male=57, female=53) and Grade 9 algebra I students (male=85, female=92). The results of this study indicated that algebra I in eighth-grade is a viable option.

Anx, Att, Alg, Ach, Gend, Curr (SE)

Petropoulos, William Z. (1999). *Improving math achievement scores on the Illinois goals assessment program using the 'countdown' video tape series.*(Loyola University of Chicago). DAI-A 60/05, p. 1491, Nov 1999. [AAT 9930583]

This study was designed in an effort to raise the 1997 IGAP mathematics scores for Third (n=439), Sixth (n=427), and Eighth (n=317) grade students. After viewing the weekly television program, students were able to converse with the on-air instructors via telephone while they learn mathematics concepts in the familiar environment of their home.

Oral, Tech, Soc, Ach, Comm (EL)

Pezeshki, Gholam Hossein. (1998). *The effect of an innovative approach on improving mathematics achievement of Mexican-American students enrolled in college algebra classes.*(Texas A&M University-Kingsville). DAI-A 59/10, p. 3721, Apr 1999. [AAT 9909714]

The effect on Mexican-American students (n=213) of an innovative teaching approach was contrasted with a traditional approach and found to have significantly positive results. Cooperative learning and mastery learning were prominent among the techniques used.

Ethn, Alg, Tchg, Styl, Grpg, Ach (PS)

Phillips-Bey, Carol Louise King. (1999). *African-American students' perceptions of the factors that led to their mathematics level placement in an integrated, suburban school district.*(Kent State University). DAI-A 60/06, p. 1950, Dec 1999. [AAT 9934553]

The purpose of this study was to explore the factors in the elementary and middle school years that led to underrepresentation of African-American students (n=8) in upper level mathematics classes. A student's cultural synchronization with the school was found to be the factor that most consistently correlated with a student's level placement.

Ethn, Soc, Lrnr (SE)

Pianfetti, Evangeline Secaras. (1998). *Digital video and mathematics: Helping high school students understand and interpret abstract concepts.*(University of Illinois at Urbana-Champaign). DAI-A 59/11, p. 4058, May 1999. [AAT 9912338]

A one-year study was taken to explore the links between mathematics as studied in schools and the real world. Among the results suggested are that digital video may enhance visualization and that multiple representations help with interconnectedness of ideas but not relationships between concepts.

Tech, Rep, Mscn, Vis (HS)

Pinzka, Marlene Kay. (1999). *The relationship between college calculus students' understanding of function and their understanding of derivative.*(University of Minnesota). DAI-A 60/05, p. 1491, Nov 1999. [AAT 9929515]

Significant correlations were obtained between students' knowledge of the function and derivative concepts and between their procedural and conceptual knowledge of each of these concepts (n=37). Qualitative data indicated that a students' (n=6) understanding of the derivative concept appears to be related to a geometric concept image of function and the ability to understand and interpret graphs of functions.

Calc, Mscn, Rep, Geom, Gend (PS)

Portafoglio, Anthony. (1998). *The effects of pair collaboration in community college computer calculus laboratories.*(Columbia University Teachers College). DAI-A 59/07, p. 2407, Jan 1999. [AAT 9839111]

Control groups working as individuals and same gender pairs took Calculus I in a computer calculus laboratory. Results suggest that achievement was higher with the pairs than with individuals and that female pairs do better than male pairs. Pairs also scored higher in an attitude survey.

CAI, Gend, Grpg, Att, Ach (PS)

Posey, Monica J. (1999). *African-American high school students in mathematics: A sociological view.*(University of Cincinnati). DAI-A 60/06, p. 1976, Dec 1999. [AAT 9933642]

This is a qualitative study of mathematics achievement among African American high school students. The results show that the students' identities and school strategies were woven with expressions of themselves in terms of gender, race, academics, occupation, and social life.

Ethn, Ach, Soc, Gend (HS)

Pratt-Cotter, Mary. (1998). *An exploratory investigation on the impact of reform precalculus on the concept of function.*(Georgia State University). DAI-A 59/10, p. 3765, Apr 1999. [AAT 9911562]

Groups studied traditional precalculus (n=30) versus reform precalculus (n=22) to compare differences in preparation for changes in calculus courses. No significant differences were found between the two groups, although the reform precalculus students proved to be more able at applications.

Calc, Ach, Rep (Not given)

Price, Terry Marie. (1998). *Second-generation constructions: Facilitating student understanding in the middle school mathematics classroom.*(Washington State University). DAI-A 60/01, p. 87, Jul 1999. [AAT 9917448]

Learning behaviors and classroom interaction of middle school students were analyzed in regard to the knowledge reconstruction process. Data on kinds of interactions and paths to learning was collected.

Clln, Lrng, Knw (MS)

Pruitt, Jane Wells. (1999). *An analysis of instructional strategies and teaching behaviors associated with teachers of mathematics in high schools operating a four-period block schedule.*(University of Maryland College Park). DAI-A 60/04, p. 1056, Oct 1999. [AAT 9925821]

Mathematics teachers, principals and district supervisors in 12 rural high schools were surveyed. Among the conclusions were: the four-period block provides opportunity for mathematics teachers to implement recommended strategies; evidence of any increase in student achievement in mathematics is mixed; extended class periods and fewer preparations do not reduce teacher load.

Curr, Tchg, Tblf (HS)

Quigley, Mark Declan. (1999). *The effects of home computer access and social capital on mathematics and science achievement among Asian-American high school students in the NELS:88 data set.*(St. John's University (New York)). DAI-A 60/02, p. 397, Aug 1999. [AAT 9918685]

The effect on mathematics and science achievement of home computer access and social capital was studied in Asian-American students. Findings support the view that home computer access has a negative direct effect on mathematics and science achievement for both Asian American males and females.

Comp, Ethn, Ach, Gend, Soc (HS)

Raban, Janet Ann. (1998). *A study of secondary mathematics teacher preparation programs' adherence to the NCTM standards.*(University of Denver). DAI-A 59/08, p. 2895, Feb 1999. [AAT 9901356]

Four exemplar schools were identified and studied to provide a compilation of best practices constituting an "ideal" model program for the preparation of secondary mathematics teachers implementing the NCTM standards. Among the best practices are seeking out of talented students and good working relationships with counterparts.

Curr, Prsv, Gift (SE, TE)

Reiter, Betty Baker. (1999). *A survey of the effects of mathcounts and olympiad mathematics competitions on students' attitudes and feelings about mathematics, science, and careers.*(University of South Carolina). DAI-A 60/04, p. 1056, Oct 1999. [AAT 9928344]

Participants reported continuing to participate in academic competitions, a decision they made without being coerced. They considered competitions to be a positive academic and social experience. Students appreciated the challenge of problem solving, as well as the social aspect. Most were continuing to study mathematics and science at high levels and many planned careers in related areas.

Att, Soc, PS, Aff, Lrnr (HS)

Rhodes, Jolene M. (1998). *A study of student retention and attitudes in a community college preparatory mathematics course.*(University of Central Florida). DAI-A 59/07, p. 2407, Jan 1999. [AAT 9841694]

A study was undertaken of the effect on attitudes and retention of the use of laboratory activities in a college preparatory course. Two laboratories, one with games and puzzles, the other with skills worksheets and group activities, were used. Retention was compared on two campuses and by gender.

Alg, Att, Gend, Grpg (PS)

Ridlon, Candice L. (1999). *The effect of problem centered learning on the mathematics of sixth graders.*(The Florida State University). DAI-A 60/03, p. 681, Sep 1999. [AAT 9922667]

Sixth grade students were randomly assigned to the problem-centered approach (n=27) or the traditional group (n=25). Data sources from both groups included a pretest and posttest, student and parent surveys, student writings, and observations by the teachers of the two groups. A quantitative and qualitative analysis of all the results showed that Problem Centered Learning was effective.

Att, Curr, Lrng, Ach (MS)

Riley, James Edward. (1999). *Elementary school mathematics: Factors affecting strategies and materials for instruction.*(Hofstra University). DAI-A 60/06, p. 1950, Dec 1999. [AAT 9933934]

Elementary school teachers (n=413) were selected randomly to respond to a survey. The most frequently used instructional strategy for mathematics in the elementary classroom is teacher-centered whole-class instruction. The least frequently used strategies included student interviews, calculators, portfolio assessment, grouping by ability, and class presentations.

Tchg, Matl, Tknw, Mtcg (EL, T)

Ritson, Irene Laura. (1998). *The development of primary school children's understanding of probability.*(Queen's University of Belfast (Northern Ireland)). DAI-A 59/12, p. 4386, Jun 1999. [AAT 9915579]

Mixed ability students, aged 6 to 12, in three different schools (n=46) were interviewed twelve times each over a period of three years in order to track their conceptual development in probability. The results focussed on the stages and rates of development.

Prob, Lrng (EL)

Rittle-Johnson, Bethany. (1999). *Iterative development of conceptual and procedural knowledge: A framework for understanding knowledge change.*(Carnegie-Mellon University). DAI-B 60/06, p. 2990, Dec 1999. [AAT 9936009]

This study evaluated an iterative model of children learning about decimal fractions. The first results provided correlational support for the iterative model. The second set of results provided causal evidence for the link from improved problem representation to improved procedural knowledge.

Decm, Rep, Lrng, PS, Lrnr (MS)

Rivera, Ferdinand Dychitan. (1998). *Mathematics pedagogy in the poststructural moment: A rhizomatic analysis of the ethos of secondary mathematics teaching in an urban setting.*(The Ohio State University). DAI-A 59/08, p. 2895, Feb 1999. [AAT 9900900]

An ethnographic research of the work and culture of four urban teachers studied the factors most influencing their work. Among the findings of

the study were that social context is important in differences between espoused and enacted beliefs and that deployment of school mathematics is "gendered."

TAtt, Tchr, Gend (HS, T)

Robinson, Georgia Kim. (1998). *A qualitative study of concept-oriented instruction and students' performance in an advanced placement statistics course.*(Georgia State University). DAI-A 59/07, p. 2408, Jan 1999. [AAT 9839254]

A study was undertaken of the initial offering of AP Statistics. Among the recommendations of the course developers were technology, and group problem solving within concept-oriented instruction and assessment. Overall, students in a concept-oriented class with an experienced, constructivist teacher scored well on the AP examination.

Stat, Assm, Tech, Grpg (HS)

Rosa, Ricardo. (1999). *Toward an implementation model of mathematics word problem-solving for English language learners.*(The University of Connecticut). DAI-A 60/04, p. 986, Oct 1999. [AAT 9926285]

It was hypothesized that the use of student-created word problems would enhance English Language Learners' mathematical abilities. No significant differences were found between the two groups (n=15,15) regarding the different problem-solving strategies used while attempting to solve word problems.

PS, CC, Ethn, Assm, Writ (MS)

Rothe, Rosemarie. (1999). *The effects of site based decision making in elementary schools on student outcomes.*(Wayne State University). DAI-A 60/06, p. 1858, Dec 1999. [AAT 9933010]

There were no differences between teachers (n=270) in the two types of schools (n=27) on their perceptions of site-based management and current participation in shared decision making. Student outcomes, as measured by MEAP test scores for reading and mathematics did not differ significantly in site-base managed and traditionally managed schools.

Plan, Tblf, Curr (EL)

Roulet, Roger Geoffrey. (1998). *Exemplary mathematics teachers: Subject conceptions and instructional practices.*(University of Toronto (Canada)). DAI-A 59/12, p. 4387, Jun 1999 ISBN: 0-612-35417-2. [AAT NQ35417]

The relationship between conceptions of mathematics and teaching practice was studied in two secondary school teachers. The teacher with a well-developed social constructivist image of mathematics practiced his personal subject philosophy despite pupil and administrative opposition. The teacher with a mixed subject conception regressed to transmissive modes.

TBlf, Tchg, TAtt, Phil (HS, T)

Runde, Dennis Clarence. (1998). *Effects of portable computer algebra systems and problem-solving heuristics on community college algebra students' word-problem-solving abilities.*(University of South Florida). DAI-A 59/11, p. 4089, May 1999. [AAT 9911514]

College students (n=199) were put into control and treatment groups to examine the effect of the use of portable computer algebra systems (PCAS) on their learning of basic college algebra in word-problem solving. Treatment students, using PCAS, performed significantly higher than control students on the posttest, but not on the word-problem final exam.

Alg, CAI, PS (PS)

Ruppert, Michelle Joy. (1999). *The effects of two goal setting procedures on math performance.*(The University of Nebraska - Lincoln). DAI-A 60/06, p. 1908, Dec 1999. [AAT 9936770]

To investigate goal-setting programs and mathematics performance this study, fourth grade students (n=4), were assigned to two different goal setting procedures: goal-setting with the goals provided and goal-setting with student derived goals. The results of this study support the use of a goal setting program as an effective intervention for children.

Curr, Knw, Blf, Ach (EL)

Ryan, Donna D. (1999). *A comparison of constant time delay and constant time delay with instructive feedback in teaching multiplication facts to children at-risk for failure in school.*(Georgia State University). DAI-A 60/04, p. 1020, Oct 1999. [AAT 9926048]

Two dyads of elementary school students studied ten target facts. Results support previous research suggesting that when students need to learn two or more target stimuli requiring the same response, they should be taught in small groups using a direct instruction procedure with embedded instructive feedback.

Grpg, Tchg, M/D, Lrng (EL)

Ryan, Peter James. (1999). *Teacher development and use of portfolio assessment strategies and the impact on instruction in mathematics.*(Stanford University). DAI-A 60/04, p. 1015, Oct 1999. [AAT 9924491]

Four experienced fifth and sixth grade teachers partnered with the researcher to create and implement guiding standards for doing mathematics, investigative open-ended assessment tasks, scoring rubrics, and instructional strategies for implementing portfolio assessment. The portfolio was a powerful vehicle for teachers to inquire about important mathematics.

Assm, Tchg, Curr, Tknw, Writ, Insv (MS, T)

Sample, Camilla Renee. (1998). *Urban algebra I students' perceptions of journal writing and its effects on achievement with integers and students' attitudes toward mathematics.*(The University of Mississippi). DAI-A 59/07, p. 2408, Jan 1999. [AAT 9842390]

The effect of writing journals on student attitude and achievement in integer operations was studied in an experimental group (n=42). No significant differences were found between either the attitude or the achievement of the experimental group when compared with the control group (n=36).

Writ, Ach, Att, Int, Soc (HS)

Samuels, Angela Elizabeth. (1998). *Multicultural mathematics materials for Bermudian middle schools.*(Columbia University Teachers College). DAI-A 59/07, p. 2408, Jan 1999. [AAT 9839120]

A collection of multicultural materials intended for use in teaching mathematics in Bermudian middle schools was developed and evaluated. Juror evaluations and field investigations confirmed that it is possible to develop materials that could satisfy the objectives of both multicultural education and good mathematics pedagogy.

Ethn, Matl (MS)

Sanders, Barbara Jean. (1998). *A cross-national comparison of fourth-grade mathematics instruction in the United States and China.*(Washington State University). DAI-A 60/04, p. 1057, Oct 1999. [AAT 9925705]

Chinese (n=79) and United States (n=29) fourth grade teachers were surveyed and observed to determine methods that will increase students understanding and achievement in mathematics. One result shows that U.S. teachers are more willing to try new methods than Chinese teachers. U.S. teachers asked more higher-level questions and encouraged students to self correct errors by rethinking.

CC, Tchg, Ach, Clln, Phil (EL, T)

Savelli-Keska, Susann. (1999). *Differences in mathematics achievement of low-achieving students in supplemental and regular integrated learning system programs at the middle school level.*(Temple University). DAI-A 60/03, p. 681, Sep 1999. [AAT 9921192]

This study determines differences in achievement of males and females who are low-achieving sixth and seventh grade mathematics students in two kinds of integrated learning systems (ILS). There were several significant results in performance. For example, females outperformed males in concepts of number. All teachers and administrators felt that there is a great need for ILS in mathematics.

Gend, Assm, Tchg, Ach, D/R (MS)

Schiff, Jorden Dane. (1999). *Student achievement and self-concept in schools with different racial compositions.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/03, p. 700, Sep 1999. [AAT 9922486]

A sample of 17,598 eighth grade students (16% black and 84% white) from 1,000 schools was examined from the National Educational Longitudinal Study: 1988. White students performed better in integrated school environments and black students academic achievement was lowest in schools with the highest percentages of minority students.

Ethn, Ach, Att, Soc (MS)

Schleyer, Claudia Janette. (1998). *A comparison of cognitive skills utilized in high school physical education, English, mathematics, and science programs.*(Texas A&M University-Kingsville). DAI-A 59/10, p. 3774, Apr 1999. [AAT 9909716]

One purposes were to identify common cognitive skills among high school physical education, science, mathematics, and English and to identify influences on the attitude to integration of physical education with other academic subjects. The perceived importance of specific cognitive skills in subject areas differed significantly. Teachers in each discipline have a positive attitude toward integration.

Curr, TAtt, IC (HS)

Schlosberg, Katharine Jo. (1998). *A comparison of girls' attitudes toward mathematics in single-sex and coeducational independent schools.*(University of California, Los Angeles). DAI-A 59/09, p. 3384, Mar 1999. [AAT 9905526]

Students at a single sex school (female) and a co-educational school were compared to investigate differences in female's attitudes to mathematics across schools and across grades. Factors such as usefulness

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of mathematics and parental influence were examined. In four of eight factors examined significant differences were found across grade.

Gend, Att, Blf (HS)

Selman, Rae V. Cuerington. (1999). *Noncognitive indicators of academic success of nontraditional older students: Toward equal access to higher education.*(The University of Nebraska - Lincoln). DAI-A 60/05, p. 1423, Nov 1999. [AAT 9929229]

Most colleges hold non-traditional students to the same requirements for admission as traditional students and are neglecting skills and attitudes acquired by the older student as a result of life experience. Many adults are rejected who could have been successful. This survey identifies characteristics of academic success for nontraditional students at a community college.

Soc, Aff, Impl (PS)

Serafino, Kathleen Carol. (1998). *Prior knowledge and anchored instruction on students' complex mathematical problem solving and transfer.*(Fordham University). DAI-A 59/07, p. 2329, Jan 1999. [AAT 9839519]

Two groups of fifth-grade students (n=50) were used to examine differences between a guided generation model of anchored instruction and a structured problem-solving model. The former model enhanced achievement in transfer of prior knowledge. Furthermore, students with high prior knowledge achieved significantly higher than low prior knowledge students.

Knw, PS, Lrng (MS)

Shawal, Mohammed Ali. (1999). *An investigation of the relationship between spatial ability and mathematics learning for elementary Yemeni students.*(The Florida State University). DAI-A 60/03, p. 641, Sep 1999. [AAT 9923693]

Data sources were participant observation, and video recordings of three third and fourth grade Yemeni children solving mathematics activities. One was able to complete to tasks and solve the problems because he used metal imagery. A major conclusion of this study is that the use of imagery greatly facilitates doing mathematics.

Vis, CC, PS, Arth (EC)

Shockey, Tod L. (1999). *The mathematical behavior of a group of thoracic cardiovascular surgeons.*(University of Virginia). DAI-A 60/06, p. 1951, Dec 1999. [AAT 9930098]

Defining ethnomathematics as the mathematics practiced by a particular group of professionals, the study investigated the mathematics done pre-operatively and intra-operatively by a group of thoracic cardiovascular surgeons. Four assertions are discussed in detail followed by a discussion of implications for mathematics education and ethnomathematics.

IC, Soc, Ethn (PS)

Shull, Rena Marie. (1998). *Investigation of the development of number sense in seventh- and eleventh-grade students over a three-year period of time.*(University of Missouri - Columbia). DAI-A 59/08, p. 2896, Feb 1999. [AAT 9901281]

Students, ten each in grades four and eight, were examined and interviewed on number sense. The same students were studied three years later to examine their development. All eleventh-grade students showed growth in the development of number sense whereas the seventh-grade students varied from moderate increase to no growth.

NSns, Knw (EC, MS, HS)

Singh, Parmjit. (1998). *Understanding the concepts of proportion and ratio among students in Malaysia.*(The Florida State University). DAI-A 59/10, p. 3766, Apr 1999. [AAT 9910710]

Grade six and nine students in Malaysia were studied to investigate their concepts of ratio and proportion. Data from interviews gave insight on importance of multiplicative thinking in proportional reasoning. Only a small percentage of students who did well on the national examinations were able to solve complex proportional problems.

Eqv, RaPc, Knw, Assm, M/D (MS, HS)

Sliva, Julie A. (1998). *Factors that relate to middle grades mathematics teachers' attitudes toward mainstreaming.*(The University of North Carolina at Chapel Hill). DAI-A 59/07, p. 2409, Jan 1999. [AAT 9840991]

Middle school mathematics teachers (n=54) were investigated on their attitude toward mainstreaming. The principal result of the study was that middle grades mathematics teachers' attitudes toward mainstreaming are similar to the general population of middle grades teachers' attitudes toward mainstreaming.

TAtt, LD, Lrnr (MS)

Smith, Cynthia Marie. (1998). *Underprepared college students' approaches to learning mathematics while*

enrolled in a strategy-embedded developmental mathematics course and while subsequently enrolled in a college-level mathematics course that did not purposefully emphasize the use of mathematics-specific learning strategies.(The Ohio State University). DAI-A 59/08, p. 2896, Feb 1999. [AAT 9900916]

Nineteen students took a strategy-embedded course receiving instruction on, for example, reading a mathematical text, learning from a lecture, and taking notes. Among the results, students reported feeling less teacher driven and took responsibility for their successes and failures.

Att, Blf, D/R (PS)

Smith, Laura Jean. (1998). *Mathematical voices: The experiences, perceptions and self-images of three women as learners of developmental mathematics and statistics.*(University of Minnesota). DAI-A 59/08, p. 2896, Feb 1999. [AAT 9903370]

The mathematical experiences, perceptions, and self-images of three nontraditional women students were examined. The "ways of knowing" theory as a conceptual framework through which teachers/researchers can better understand students' mathematical voices was demonstrated. Students find difficulty transforming their mathematical voices by making connections among perspectives of knowing.

Gend, Styl, Att, Knw (PS)

Smith, Stephanie Zeyer. (1998). *Impact of curriculum reform on a teacher's conceptions of mathematics.*(The University of Wisconsin - Madison). DAI-A 60/01, p. 87, Jul 1999. [AAT 9840151]

A fifth grade teacher participated in a field experience of learning the mathematics curriculum through problem solving with other teachers, teaching with classroom materials, and reflecting on the experience. As a result, she developed increased mathematical understanding, intuition, and communication skills.

Curr, Tknw, Insv, Comm, TBlf (TE/EL)

Soeharto, S. (1998). *The effects of a constructivist learning environment on grade six student achievement and attitude toward mathematics in Indonesian primary schools.*(UNIVERSITY OF HOUSTON). DAI-A 59/10, p. 3741, Apr 1999. [AAT 9911461]

A treatment group of fifteen primary school teachers were provided training in the use of constructivist techniques to investigate whether constructivist learning environments promote mathematics achievement in rural schools in Indonesia. There were significant differences between the treatment and control groups of students.

Ach, Att, Lrng, Tchg, Insv, Ethn (MS, T)

Souders, Virginia Peck. (1998). *Technology and test scores: The impact of technology funding on student achievement as measured by standardized test scores on the Georgia high school graduation tests.*(The University of Tennessee). DAI-A 60/06, p. 1997, Dec 1999. [AAT 9936304]

The study tracked a large, highly diverse student population (n=11,083) over three years. The conclusion was that technology funding makes a significant improvement in English test scores and no significant difference in mathematics test scores.

Tech, IC, Ach, Assm (HS)

Stack, Robert Vernon. (1998). *The effects of journal writing on the geometric understanding of preservice elementary teachers.*(University of South Dakota). DAI-A 59/12, p. 4387, Jun 1999. [AAT 9916203]

A group of preservice elementary teachers were studied to investigate the effect of journal writing on their geometric understanding and geometry proof-writing abilities. It was found that journal writing can be used to improve the geometric understanding in terms of van Hiele levels.

TKnw, Geom, Writ, Prf, Prsv (EL, TE)

Stannard, Laura Lenzen. (1999). *An exploration of play performance in structured materials (blocks, legos, and carpentry) and its relationship to later school success in mathematics.*(The Florida State University). DAI-A 60/06, p. 1899, Dec 1999. [AAT 9935676]

In the early grades of 3 and 5 play was not a significant predictor of mathematical achievement. At grade 7 construction play and standardized test scores were found to be significant, and in high school the participant's play performance and number of higher mathematics classes, number of honors classes, and average mathematics grade, were all found to be significant.

Ach, Patt, Manp, Styl (ALL)

Steig, Mary Jo. (1999). *Factors related to community college student choice between three college algebra learning environments.*(Arizona State University). DAI-A 60/03, p. 682, Sep 1999. [AAT 9923940]

Three choices of learning environments varied in the reliance of face-to-face meetings and Internet technologies. Recommendations are made to

help focus on helping adult learners achieve by responding to their needs and preferences for learning environments.

Tech, Curr, Lrnr, Alg, Styl (PS)

Stemn, Blidi S. (1998). *An examination of the characteristics associated with at-risk African-American students experiencing success in high school mathematics* (The University of Connecticut). DAI-A 59/10, p. 3766, Apr 1999. [AAT 9909793]

A group of at-risk African-American high school students (n=6) experiencing success in mathematics were studied to examine factors contributing to their performance. These students believed that success in mathematics was due to their interest in the subject, belief in mathematics ability, solving extra mathematics problems, meaningful parental involvement, and motivation.

Ethn, Att, Blf, Soc (HS)

Stephan, Michelle Louise. (1998). *Supporting the development of one first-grade classroom's conceptions of measurement: Analyzing students' learning in social context* (Peabody College For Teachers of Vanderbilt University). DAI-A 59/09, p. 3385, Mar 1999. [AAT 9905860]

The literature on students' conceptions of measurement was augmented by utilizing new theories of learning and instructional design. The process of learning to measure is accounted for in both social and psychological terms through the study of a first-grade classroom community as well as individual students' learning.

Meas, Lrng, Soc (EC)

Stevens, Reed Richard. (1999). *Disciplined perception: Comparing the development of embodied mathematical practices in school and at work* (University of California, Berkeley). DAI-A 60/06, p. 1908, Dec 1999. [AAT 9931410]

This dissertation compares the working and learning practices in a middle-school mathematics classroom and a professional architecture firm. The analyses compare the settings as places to learn and work and identifies similarities and differences in the form, content, and function of disciplined perception. The author argues that the classroom was a lousy place to learn and work.

IC, Patt, Knw, Cln (MS)

Strickland, Jeffrey Scott. (1999). *How students make meaning in a reform calculus course* (University of Northern Colorado). DAI-A 60/04, p. 1057, Oct 1999. [AAT 9927746]

Two cases were selected purposefully for the data they were expected to yield. The focus questions are: Which type of class-related materials aid in understanding calculus? What is the nature of the meaning of objects created through interaction? What is the nature of the interpretive process used to create and modify meaning?

Calc, Cln, Curr, Aff, Comm (PS)

Strychasz, Gloria Marie. (1999). *Mathematics self-efficacy: A social cognitive intervention for elementary school children* (Arizona State University). DAI-A 60/03, p. 652, Sep 1999. [AAT 9923539]

This dissertation applies a social cognitive framework to elementary school students by an intervention using self-regulated learning (SRL) strategies. The SRL intervention increased the mathematics self-efficacy of students in the regular track, but the same strategies did not affect the gifted class. Arguments for early intervention to enhance girls' mathematical self-efficacy are given.

Gift, Impl, Att, Aff (EL)

Suyanto, Wardan. (1998). *The effects of student teams-achievement divisions on mathematics achievement in Yogyakarta rural primary schools* (University of Houston). DAI-A 59/10, p. 3766, Apr 1999. [AAT 9911462]

The impact of the Student Teams-Achievement Division (STAD) cooperative learning model on students' (n=664) mathematics achievement and their perceptions of classroom environments was studied in rural primary schools in Indonesia. STAD classes performed significantly higher on tests of mathematics knowledge than the traditionally instructed classes.

Grpg, Ach, Soc (EL)

Suzuki, Kyoko. (1998). *Measuring "to think mathematically": Cognitive characterization of achievement levels in performance-based assessment* (University of Illinois at Urbana-Champaign). DAI-A 59/11, p. 4059, May 1999. [AAT 9912391]

A measurement instrument, The Mathematical Abilities in Reasoning and Communication (MARC) scale, which identifies higher-order thinking, such as mathematical reasoning, problem-solving strategies, and communication, was developed. Distinctive

features of the MARC scale include a general scoring rubric with guidelines on achievement levels across tasks.

Assm, PS, Prf (PS)

Tan, Jiang. (1998). *Effects of rephrasing word problems on sixth-grade ESL and native English-speaking students' mathematics performance and attitudes.*(Texas Tech University). DAI-A 59/11, p. 4036, May 1999. [AAT 9912807]

A study of grade 6 students (n=104) investigated effects of native language and rephrasing of word-problems on students' performance. Students working with revised versions of mathematics word-problems outperformed those working with the original version. However, the enhancing effect of rephrasing was stronger for native English-speaking students than for ESL students.

Lang, PS, Ach, Att (MS)

Thorndike-Christ, Tracy. (1998). *The impact of ability and motivation on achievement in college-level mathematics.*(The University of Nebraska - Lincoln). DAI-B 59/11, p. 6089, May 1999. [AAT 9912698]

Scholastic Assessment Test- Mathematics (SAT-M) and the university's Mathematics Placement Test Score (MPTS) were used as measures of general mathematics ability and background knowledge in mathematics, respectively. Final mathematics course grade was found to be a function of SAT-M score, perceived usefulness/utility value of mathematics, and confidence in learning mathematics (n=214).

Soc, Blf, Att, Ach, Aff (*)

Thurman, Carol. (1999). *Improving the mathematics homework completion of middle school students through involvement of their parents in using a homework telephone hotline system.*(The University of Nebraska - Lincoln). DAI-A 60/06, p. 1909, Dec 1999. [AAT 9936775]

A telephone answering system allowed students(n=60) and parents to access information about homework after hours. A pilot study found 88% of students utilized the system, but two-thirds of the students said their parents never used the system. The author expected to demonstrate a correlation between assignment completion and system utilization.

Tech, Comm, Soc, Matl (MS)

Timmerman, Maria Ann. (1998). *Learning in the context of a technology-enriched mathematics teacher education course: Two case studies of elementary teachers' conceptions of mathematics, mathematics teaching and learning, and the teaching of mathematics with technology.*(The Pennsylvania State University). DAI-A 59/08, p. 2896, Feb 1999. [AAT 9901145]

Two female elementary school teachers were studied as they understood their conceptions of teaching and learning in the context of a technology-enriched master's level course. The need to challenge teachers' conceptions of mathematical understanding and provide scaffolding and the possibility for use of computers to develop ways for teachers to communicate mathematically are asserted.

Insv, TBlf, TKnw, CAI, Styl (El, T)

Tinkler, Thomas Vaughn. (1998). *An attention, tactics, operations, solution, unique-conditions guided assessment model for the teaching mathematical problem-solving in schools.*(The Ohio State University). DAI-A 59/10, p. 3766, Apr 1999. [AAT 9911280]

A guided assessment for evaluating mathematical problem-solving called the (A)ttention, (T)actics, (O)perations, (S)olutions, and (U)nique-conditions model was developed and tested. Experimental results yielded a multivariate interaction effect between levels of gender with levels of treatment on the conceptual, procedural, and problem-solving dependent variables.

Assm, Gend, PS (EC)

Tiwari, Tapan Kumar. (1999). *Integrating computer algebra systems as an instructional aid in an introductory differential calculus course.*(Mississippi State University). DAI-A 60/05, p. 1491, Nov 1999. [AAT 9930357]

This study examines the effect of using Mathematica as an instructional tool for enhancing conceptual knowledge and problem solving abilities. The results show a significantly higher scores on both conceptual and computational parts of an examination. A higher percentage of students in the experimental group had a better understanding of the derivative.

Calc, CAI, M/CBL, PS (PS)

Tokar, Inna. (1999). *Schools for the mathematically talented in the former Soviet Union.*(Columbia University). DAI-A 60/05, p. 1492, Nov 1999. [AAT 9930819]

The study sought to answer: (1) What opportunities were available for mathematically gifted students

before Physics-Mathematics day schools for gifted were opened? (2) Why and how were they organized? (3) In what ways have these schools changed in the post-Soviet era? Analyses of the current situation demonstrated that the future of these schools is uncertain due to current financial and political instability in the former Soviet Union.

Gift, Ethn (ALL)

Towers, Julie Margaret. (1998). *Teachers' interventions and the growth of students' mathematical understanding* (The University of British Columbia (Canada)). DAI-A 59/12, p. 4388, Jun 1999. ISBN: 0-612-34635-8. [AAT NQ34635]

The ways in which teachers' interventions affect the growth of students' mathematical understanding were studied in two cases. Three teaching styles and twelve teaching strategies described the teachers' actions-in-the-moment. The interventions are examined through an integration of traces of students' growth of understanding with consideration of the teachers' strategies and styles.

Tchg (HS)

Trlica, Kelly Hines. (1998). *The effect of alternating block scheduling on middle school mathematics achievement growth* (Baylor University). DAI-A 59/08, p. 2810, Feb 1999. [AAT 9902942]

There was no significant difference in achievement between students with alternating blocks and those with traditional schedules (36 schools). African-American, Hispanic, economically disadvantaged and at risk students showed negative gain across the grades, but not different for blocks and traditional schedules. Asian and gifted/ESL students showed positive gain.

Ach, Curr, Ethn (MS)

Truitt, Bettie Ann Degryse. (1998). *How teachers implement the instructional model in a reformed high school mathematics classroom* (The University of Iowa). DAI-A 59/09, p. 3385, Mar 1999. [AAT 9904363]

Two experienced Core-Plus Mathematics Project teachers' are studied to examine the difference between espoused and enacted beliefs. One teacher exhibits a high correlation between theory and practice, The other does not and is less successful.

Curr, TBlf, Tchg (HS, T)

Trujillo, Karen Marie. (1998). *Student attitudes toward mathematics projects* (New Mexico State University). DAI-A 59/07, p. 2409, Jan 1999. [AAT 9842356]

A group of students (n=304) were studied to examine the relationship between mathematics anxiety, learning preference, exposure to projects, the teacher, gender, ethnicity and attitude toward projects. Statistical differences were small possibly because of a generally positive attitude toward projects. Students disliked negative group experiences and the amount of writing.

Assm, Att, Grpg, Gend, Ethn, Writ (HS)

Ullah, Hafeez. (1998). *The influence of family and school on mathematics achievement in four selected rural areas of Pakistan* (University of Maryland College Park). DAI-A 59/10, p. 3710, Apr 1999. [AAT 9909021]

Students in Pakistan were studied (n=435) to examine the influence of family and school characteristics on mathematics achievement. If males from disadvantaged backgrounds attend at least an average-quality school, they have higher than average achievement. Females from such backgrounds have higher than average achievement only if they attend high-quality schools.

Eqty, Gend, Soc (K-12)

Vahey, Philip James. (1998). *Promoting student understanding of elementary probability using a technology-mediated inquiry environment* (University of California, Berkeley). DAI-A 60/03, p. 712, Sep 1999. [AAT 9923080]

This investigation into middle school students' understanding of probability uses a two-level approach. At the first level individual elements of reasoning are analyzed. At the second level a model of idealized probabilistic reasoning is studied. Instructional activities that aid students in coming to a more sophisticated understanding of probability are analyzed.

Prob, PS, CAI, Matl (MS)

Vancleave, Martha Eleanor. (1999). *Beliefs and classroom practices of teachers who persist in the use of graphing calculators in the teaching of high school algebra* (Oregon State University). DAI-A 60/06, p. 1951, Dec 1999. [AAT 9933211]

Analysis included exploration of the consistencies and discrepancies within individual teacher's (n=4) beliefs and practices, and comparisons of teachers' professed beliefs and demonstrated practices to the constructivist theory. The use of graphing calculators was found to focus on learning to use the tool to do mathematics and not as a tool to learn mathematics.

GCal, TBlf, Lrng, Alg (HS)

Wahlberg, Melanie Ann. (1998). *The effects of writing assignments on second-semester calculus students' understanding of the limit concept.*(Western Michigan University). DAI-A 59/07, p. 2409, Jan 1999. [AAT 9840046]

Students performing writing tasks (n=37) scored higher on the limit concept than the control group(n=34) on three out of four problems. Writing assignments and interviews with a subset (n = 5) of the treatment group were used to assess cognitive growth. Some achieved elements of object-level understanding, a level never before reported in the literature.

Calc, Writ (PS)

Walker, Cynthia Marie. (1998). *Using contrasting pedagogical approaches to detect differential item functioning in the Third International Mathematics and Science Study.*(University of Illinois at Urbana-Champaign). DAI-A 59/11, p. 4117, May 1999. [AAT 9912416]

Teachers of grades seven and eight were divided into traditional and constructivist groups to conduct differential item functioning analyses to determine a possible advantage in mathematical reasoning for students receiving a constructivist approach. Confirmatory factor analyses, based on classification of items as reasoning or fact or skill were conducted on the TIMMS items.

Tchg, Lrng, PS, Assm (MS)

Wang, Jian. (1998). *Learning to teach mathematics: Preservice teachers, their collaborating teachers and instructional contexts.*(Michigan State University). DAI-A 59/10, p. 3793, Apr 1999. [AAT 9909383]

Four elementary preservice teachers were provided with training in constructivist methods. Although they brought many constructivist ideas into their internship, three of these preservice teachers were unable to retain all these ideas or articulate them into their practice. The preservice teachers moved closer to their collaborating teachers at both conceptual and practical levels.

Prsv, Tchg, Lrng, Tchr (TE, EL)

Watters, Deborah Mayann. (1998). *The mathematical preparation of prospective elementary school teachers in Texas.*(Texas Tech University). DAI-A 59/07, p. 2355, Jan 1999. [AAT 9842006]

The state of existing mathematics courses required for preparation of elementary school teachers at colleges and universities in Texas was studied. Mathematics content course requirements ranged from a one course requirement to a six course requirement, with over half of Texas colleges and universities not meeting the minimum three course requirement.

Prsv, TKnw (TE, EL)

Weber, Thomas E. (1998). *Graphing technology and its effect on solving inequalities.*(Wayne State University). DAI-A 60/01, p. 88, Jul 1999. [AAT 9915749]

Two groups of students studied and were subsequently tested on the determination of interval solutions to inequalities involving the absolute value and the quadratic functions. One group used graphing calculators in their study; the other did not. The group having learned with calculators scored significantly higher on the exam, however they did not have a more positive attitude toward mathematics.

GCal, Alg, Att (ALL)

Weinstein, Gideon Lee. (1998). *Towards a framework for understanding ways of knowing mathematics: Six students in finite mathematics and a linked support course.*(Indiana University). DAI-A 60/02, p. 371, Aug 1999. [AAT 9919493]

Student progress in mathematical knowledge and understanding was recorded throughout an academic year using two developmental categories, Learning Mathematics and Verifying Mathematics. Pupils were categorized within five levels of sophistication. Mathematically naïve students passively received knowledge and mimicked their instructor. The more advanced learner became more aware of concepts and underlying patterns.

Lrng, Knw, Att, Blf (PS)

Weir, M. Donna. (1999). *The application of professional development in combinatorics and proof to classroom teaching.*(Rutgers The State University of New Jersey - New Brunswick). DAI-A 60/05, p. 1492, Nov 1999. [AAT 9929689]

This study examined the classroom teachers in their interactions with the children in a classroom setting. The study shows that teachers' implementation of investigations in their own classrooms followed the model of the teacher workshop sessions. They successfully orchestrated lessons where students were actively engaged in building powerful mathematical ideas.

Insv, TKnw, Lrng, DscM, Prf (SE, T)

Welch, Martha Hollowell. (1998). *Integrating applications and algebraic problem solving: Development and*

evaluation of a teacher education manual (North Carolina State University). DAI-A 60/06, p. 1951, Dec 1999. [AAT 9933906]

A teaching manual of copy-ready hands-on activities to integrate applications into high school mathematics was developed. A workshop was held on integrating the activities from the manual into algebra. In the evaluation and validation phase, teachers consistently described the manual as an appropriate resource of activities for mathematics teachers to use in integrating applications into algebra I.

Matl, IC, Alg, Tchg, Insv (HS ,T)

Whicker, Kristina Marie. (1999). *Cooperative learning in high school advanced mathematics courses.* (The University of Memphis). DAI-A 60/06, p. 1951, Dec 1999. [AAT 9933453]

Investigating the effects of cooperative learning with group rewards (extra points), this study found that students much preferred individual rewards. Mathematics achievement was about the same in all groups studied. Many of the students indicated that they learned the material better as a result of the cooperative learning groups.

Grpg, Comm, Calc (HS)

White, Deborah Dawn. (1998). *Gender, and the relations among measures of math and science interests, self-estimated abilities, and abilities.* (University of Minnesota). DAI-B 59/07, p. 3729, Jan 1999. [AAT 9838673]

Adults (264 women, 313 men) were studying to examine whether the relationships among interests, objectively measured ability, and self-perceived ability vary across gender. Results varied with the scales used to operationalize variables. Gender differences also were found.

Gend, Att, Ach (PS)

White, Jacquelyn Ann. (1998). *A study of the effects computer-assisted algebra instruction has on attitude towards mathematics and computers; student success rate; and success for different personality style.* (University of Central Florida). DAI-A 59/07, p. 2409, Jan 1999. [AAT 9841684]

Among the findings were a significant decline in attitude toward mathematics for students receiving computer based instruction but no significant change in computer attitude scores. Student behavior patterns in computer instruction are not a strong predictor of grade distribution. Computer integration in mathematics instruction had no apparent effect on student success rate.

CAI, Att, Styl, Ach, Tech, Alg (PS)

(White) Lucas, Paula Lee. (1998). *The relation of gender and attitudes to math achievement levels among fourth, fifth, and sixth grade students.* (West Virginia University). DAI-A 60/06, p. 1951, Dec 1999. [AAT 9926666]

Gender (females=225, males=208) emerged as a significant factor in reflecting grades assigned by the teacher. However, gender was not significant in association to mathematics achievement test scores. The only attitudinal measure that was significant throughout the three grades was confidence.

Gend, Att, Ach, Tchg (EL)

Williams, Barbara B. (1999). *An examination of change in instructional behaviors: A three-subject case study.* (East Carolina University). DAI-A 60/04, p. 1004, Oct 1999. [AAT 9925136]

Three teachers made efforts to implement new instructional strategies in mathematics. They took a summer workshop which was supported by follow-up sessions, coaching, modeling, materials, as well as evaluations. Teachers needed stronger support in the more complex areas of instruction: cooperative learning, integration of curriculum, and mathematical investigations.

Insv, Tchg, TAtt, Matl (T)

Williamson, Phillip Martin. (1999). *Relative language dominance and mathematical problem- solving strategies in English and in Spanish of high school students.* (New York University). DAI-A 60/06, p. 1952, Dec 1999. [AAT 9935666]

This investigation studies the relationship between mathematics proficiency and language dominance in a bilingual education program at a high school level (n=12). The results indicated there were a greater number and variety of problem solving strategies used when learners were proficient in their first language.

Ethn, PS, CC, Comm (HS)

Wisniewski, Ronald S. (1998). *The effects of an integrated curriculum on students' attitudes and abilities regarding the application of calculus to physics problems.* (University of Northern Colorado). DAI-A 59/07, p. 2410, Jan 1999. [AAT 9839543]

Physics and non-physics students were studied to examine the effect of integrated calculus-physics instruction. After experimental instruction, students in

the integrated group displayed more positive attitudes and beliefs about physics and connections with calculus than an integral calculus group. However, there was no evidence that experimental instruction helped in calculus-based physics problems.

IC, Calc, PS, Rep (PS)

Wright, Vella South. (1998). *Breaking the time barrier: Algebra instruction in an alternate-day block schedule.*(Virginia Polytechnic Institute and State University). DAI-A 59/07, p. 2437, Jan 1999. [AAT 9831673]

The study is a detailed description of algebra instruction in an extended alternate-day block schedule in Virginia. Among the findings were that although the block offers time for a range of activities, teachers typically use a familiar three-part model: a prompt focus; explanation with modeling; time for practice and summarization.

Curr, Alg, Tchg (HS)

Yamamoto, Takashi A. (1998). *Children's understanding of introductory multiplication and its relation to their performance of calculation and word problem-solving* (Columbia University). DAI-B 59/07, p. 3742, Jan 1999. [AAT 9839028]

Third and fourth grade children's (n=66) understanding of introductory multiplication was defined, assessed and compared to their performance in calculation and word problem solving. One of the core concepts, Regular Grouping, turned out to be the key for children to construct a better organized understanding of introductory multiplication.

M/D, Lrng, PS (EC)

Yee, Patricia Ann. (1998). *Exploring portfolios as a source for indicators of opportunity to learn* (University of Southern California). DAI-A 60/02, p. 400, Aug 1999. [AAT 9919128]

In response to the need for better evidence of implemented and experienced curriculum, student portfolios are a promising approach to assessing OTL. OTL information is valuable in evaluating classroom experiences, learning, and the equality of learning opportunities.

Curr, Lrng, Assm (EL)

Zachai, Judith. (1999). *Adult learners' math self-concept as a barrier to passing California State University's entry level mathematics (ELM) test.*(University of San Francisco). DAI-A 60/04, p. 1048, Oct 1999. [AAT 9928134]

This study examines adult learners(age> 25 years, n=111) who failed the ELM test. Of all the factors considered, (math history, gender, family situation, etc.), mathematics self-concept was an important determinant. Preparation courses for the ELM test and remedial mathematics courses for adult learners should acknowledge low mathematics self-concept as a debilitating barrier to performance.

Ach, Assm, Att, Gend, Soc (PS)

Zankofski, Deborah Ann. (1999). *The effects of demographic and background variables on student performance in mathematics for general education.*(George Mason University). DAI-A 59/11, p. 4040, May 1999. [AAT 9911878]

The study examined the following variables: citizenship, age, gender, ethnicity, time of class meeting, (part/full time) student status, and (part/full time) instructor employment. All variables were significantly related ($p<05$) to at least one of the following measures: grade, passing rate, and C or better rate.

Gend, Ethn, Soc, Tchr (PS)

Zhu, Renbang. (1998). *Application of hierarchical linear model (3L) to the study of student and school effects on elementary students' math performance over time* (University of South Carolina). DAI-A 60/02, p. 344, Aug 1999. [AAT 9919001]

From 1990 - 1994, Stanford Achievement Test math results of (n=1,679) students from 30 schools were analyzed. Results indicate that better prepared students progress faster than fresh starters. Schools containing a higher number of students with lower initial abilities progress more quickly than schools with better prepared students. However, further investigation into better fitting models is needed.

Knw, Lrng, Rsch (EL)

Dissertations by Institution

Canada

Simon Fraser University
Campbell

University of Alberta
Ahn; Graham; Klassen; Mabbott; Roulet

The University of British Columbia
Towers

Northern Ireland

Queen's University of Belfast
Ritson

United States

American University
Foret; Long

Arizona State University
Chao; Gannon; Huang; Steig; Strychasz

Auburn University
Lomax

Barry University School of Education
Perez

Baylor University
Drottar; Forbes; Kelly; O'Leary; Trlica

Boston University
Gray; Loud

Carnegie-Mellon University
Rittle-Johnson

Clemson University
Gregg

Cleveland State University
Martin

Columbia University Teachers College
Anderson; Baynes; Chacko; Feldberg; Han; Jean; Jean; Little; Portafoglio; Samuels; Tokar; Yamamoto;

Cornell University
Lachance

Delta State University
Nisbett

East Carolina University
Williams

Emory University
Dickerson

Florida State University
Biske; Cates; Marinas; Melita; Naylor; Ridlon; Shawal; Singh; Stannard

Fordham University
Heinrich; Serafino

George Mason University
Brown; Hall; Zankofski

George Washington University
Adams; Gross

Georgia State University
Botta; Pratt-Cotter; Robinson; Ryan

Harvard University
Kaminski

Hofstra University
Riley

Illinois State University
Chi; Miller; Mooney

Indiana University
Elshafei; Kehle; Weinstein

Iowa State University
Kayona

Johns Hopkins University
Mainzer

Kent State University
Melillo; Omniewski; Phillips-Bey

Loyola University of Chicago
Camp; Kerr; Petropoulos

Michigan State University
Crumbaugh; Gormas; Hauger; Jones; Krebs; Wang

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Mississippi State University
Tiwari

Montana State University
Goudelock; Harpster

New Mexico State University
Hogan-Gancarz; Trujillo

New York University
Williamson

North Carolina State University
Isley; Welch

Northern Arizona University
Axtell Dean

Northern Illinois University
Billings; Gjertsen Hines

Northwestern University
Murphy

Ohio State University
Bucci; Enyart Idris; Rivera; Smith; Tinkler

Ohio University
Bourquin; Noguera

Oklahoma State University
Hawkins

Oregon State University
Vancleave

Peabody College For Teachers of Vanderbilt University
Stephan

Pennsylvania State University
Timmerman

Rutgers The State University of New Jersey—New Brunswick
Adleman; Alfred; Bellisio; Fairman; Muter; Schiff; Weir

Seattle University
Davis; Dorner

Seton Hall University
Krenicki

St. John's University
Geiser; Merckling; Miranda; Orazio;

Stanford University
Eaton; Larriva; Mceneaney; Mendez; Ryan

State University of New York at Albany
Hurley

State University of New York at Stony Brook
Ely

Syracuse University
Nigam

Temple University
Savelli-Keska

Tennessee State University
Green

Texas A&M University
Crider; Haas

Texas A&M University-Commerce
Edmonds

Texas A&M University-Kingsville
Pezeshki; Schleyer

Texas Tech University
Tan; Watters

Texas Woman's University
Hernandez

University of Alabama
Perry

University of Arizona
Carriveau; Hogan

University of California, Berkeley
Izsak; Stevens; Vahey

University of California, Los Angeles
Arvedson; Hofstetter; Jacobs; Schlosberg

University of California, Riverside
Johnson

University of California, San Diego
Clement

University of California, Santa Barbara
Havill

University of California, Santa Cruz
Lopez

University of Central Florida
Breneman; Rhodes; White

University of Chicago
Fan; Levin

University of Cincinnati
Posey

University of Connecticut
Chen; Mcgivney-Burelle Rosa; Stemn

University of Delaware
Laudien

University of Denver
Raban

University of Florida
Gerretson

University of Georgia
Boone; Herbst; Lanier; Matos

University of Houston
Hill; Johar; Kim; Soeharto; Suyanto

University of Illinois at Chicago
Canfield; Carter

University of Illinois at Urbana-Champaign
Flores; Pianfetti; Suzuki; Walker

University of Iowa
Murdock; Truitt

University of Kansas
Fleming

University of Louisville
Nussbaum

University of Lowell
Cohen; Kelley; Kuchler

University of Maryland College Park
Adams; Pruitt; Ullah

University of Massachusetts
Oquendo-Rodriguez

University of Memphis
Macleod; Whicker

University of Miami
Algaze; Bedell; Kelley

University of Michigan
Cha; Flowers

University of Minnesota
Bang; Kennedy; Pinzka; Smith; White

University of Mississippi
Denson; Sample

University of Missouri – Columbia
Shull

University of Missouri - Kansas City
Mitchell

University of Nebraska – Lincoln
Buerman; Johnson; Ruppert; Selman; Thorndike-Christ; Thurman

University of New Mexico
Brown-Kovacic

University of North Carolina at Chapel Hill
Moyer; Sliva

University of North Carolina at Greensboro
Charles; Creech; Osterhus

University of North Texas
Hernandez

University of Northern Colorado
Blackburn; Bush; Chilcoat; Merz; Strickland; Wisniewski

University of Oklahoma
Bergthold; Dupree; Geoghegan; Johnson; Lopp; Matthews

University of Pittsburgh
Burkett; Carbone; Letshabo

University of Rhode Island
Bruno

University of San Francisco
Blasquez; Gilson Malouf; Zachai

University of Sarasota
Berryman; Bird; Burchill; Patterson

University of South Carolina
Nettles; Reiter; Zhu

University of South Dakota
Stack

University of South Florida
Cran; Johnson; Runde

University of Southern California
Choi; Johnson Yee

University of Southern Mississippi
Goss; Handley; Long; Long; Miller

University of Tennessee
Bryant; Fox; Souders

University of Texas at Austin
Celedon; Hannigan

University of Utah
Looman

University of Virginia
Adamy; Shockey

University of Wisconsin – Madison
Brendefur; Grunow; Smith

University of Wyoming
Lees

Virginia Polytechnic Institute and State University
Donald; Nelson; Wright

Washington State University
Dunn; Li; Price; Sanders

Wayne State University
Rothe; Weber

West Virginia University
Cipoletti; Hendricks; Larew; Mitchell; White-Lucas

Western Michigan University
Wahlberg

Widener University
Collins

Research Articles in Mathematics Education Published in 1999

Matthew D. Conley
The Ohio State University

This section lists 148 articles in mathematics education research that were published in 1999. Each entry is coded (see *Key to Codes*) with one to three major topic codes (in bold type) and any number of minor topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate codes (Prsv, Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teaches, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 73). A list of the journals searched and the number of articles included from each is provided at the end of this section (see page 63).

Aberg-Bengtsson, Lisbeth. (1999). Dimensions of performance in the interpretation of diagrams, tables, and maps: Some gender differences in the Swedish scholastic aptitude test. *Journal of Research in Science Teaching*, 36(5), 565-82.

This study investigated the dimensions underlying performance on the diagrams, tables, and maps subset of the Swedish Scholastic Aptitude Test. The author concludes that gender difference in performance is due, to a great extent, to the quantitative factor influencing test items.

Gend, CC, Ach (SE)

Adedayo, O. A. (1999). Differential effectiveness by gender of instructional methods on achievement in mathematics at tertiary level. *Educational Studies in Mathematics*, 37(1), 83-91.

The author investigates the effects of three methods of teaching on achievement in mathematics using traditional lecture method, interactive method with individual use of materials, and interactive method with group use of materials. They report a significant interactive effect of gender and method of teaching on students' achievement.

Tchg, Grpg, Gend (PS)

Adler, Jill. (1999). The dilemma of transparency: Seeing and seeing through talk in the mathematics classroom. *Journal for Research in Mathematics Education*, 30(1), 47-64.

This study argues that the dual functions--visibility and invisibility--of talk in mathematics classrooms create dilemmas for teachers. The findings provides an analytic narrative vignette drawn from a secondary mathematics classroom in South Africa to illustrate the dilemma of transparency that mathematics teachers can face.

Comm, Oral, Ethn (SE)

Ainsa, Trisha. (1999). Success of using technology and manipulatives to introduce numerical problem solving skills in monolingual/bilingual early childhood classrooms. *Journal of Computers in Mathematics and Science Teaching*, 18(4), 361-69.

This study piloted and evaluated a mathematics activity initially utilizing manipulatives, then progressing to computer software. The author concludes that there were no significant differences between learning tasks, monolingual students vs. bilingual students, and manipulative activities vs. computer activities.

Comp, Manp, PS, Ethn (EC)

Anderson, Malcolm; Bloom, Lyn; Mueller, Ute; Pedler, Pender. (1999). The impact of the graphics calculator on the assessment of calculus and modeling. *International Journal of Mathematical Education in Science and Technology*, 30(4), 489-98.

This inquiry considers some changes that the use of graphics calculators imposes on the assessment of calculus and mathematical modeling at the undergraduate level. Findings suggest some of the ways in which the assessment of mathematical tasks can be modified as the mechanics of calculation become routine.

Calc, GCal, Rep, Assm (PS)

Armstrong, Gerald M.; Hendrix, Lee J. (1999). Does traditional or reformed calculus prepare students better for subsequent courses? A preliminary study. *Journal of Computers in Mathematics and Science Teaching*, 18(2), 95-103.

This study compares student achievement based upon which calculus program--traditional calculus, Harvard Consortium Calculus, or Calculus Using Mathematica--the student completed. The authors

found some differences when students took different types of calculus during subsequent terms.

Calc, Curr (PS)

Armstrong, P.K.; Croft, A.C. (1999). Identifying the learning needs in mathematics of entrants to undergraduate engineering programmes in an English university. *European Journal of Engineering Education*, 24(1), 59-71.

This article describes the results of surveys of students' confidence in basic mathematics and the subsequent diagnostic testing of basic mathematical skills. The authors identify learning needs and ways in which students can be supported.

Att, Lrnr (PS)

Artzt, Alice F. (1999). A structure to enable preservice teachers of mathematics to reflect on their teaching. *Journal of Mathematics Teacher Education*, 2(2), 143-66.

The author describes how a framework for studying relationships between cognition and instructional practices of preservice secondary mathematics teachers was used to engage preservice teachers in structured reflection upon their teaching.

Prsv, TKnw, Tchg (TE, SE)

Artzt, Alice F.; Armour-Thomas, Eleanor. (1999). A cognitive model for examining teachers' instructional practice in mathematics: A guide for facilitating teacher reflection. *Educational Studies in Mathematics*, 40(3), 211-35.

The authors develop a model to examine teachers' instructional practice in secondary school mathematics in relationship to their underlying cognitions. The study indicates that the value of the model lies in its ability to enable teachers to reflect on their practice.

Plan, Tchg (SE, T)

Barzilai, Harel. (1999). Graduate student initiated calculus reform--part I. *PRIMUS*, 9(1), 29-38.

This article provides an overview of an on-going calculus reform that includes cooperative learning, oral presentations, and long-term student projects.

Calc, Grpg, Curr, Oral (PS)

Batanero, Carmen; Serrano, Luis. (1999). The meaning of randomness for secondary school students. *Journal for Research in Mathematics Education*, 30(5), 558-67.

This study examined possible differences in secondary students' conceptions of randomness before and after instruction in probability. The authors indicate that students' subjective understanding of randomness is close to some interpretations of randomness throughout history.

Prob, Stat, Lrng (SE)

Battista, Michael T. (1999). Fifth graders' enumeration of cubes in 3D arrays: Conceptual progress in an inquiry-based classroom. *Journal for Research in Mathematics Education*, 30(4), 417-48.

This investigation utilizes the psychological and sociocultural components of a constructivist paradigm to provide a detailed analysis of how the cognitive constructions students make as they enumerate 3D arrays of cubes develop and change in an inquiry-based, problem-centered mathematics classroom.

PS, Geom, Manp (MS)

Bischoff, Paul J.; Hatch, Douglas D.; Watford, Lettie J. (1999). The state of readiness of initial level preservice middle grades science and mathematics teachers and its implications on teacher education programs. *School Science and Mathematics*, 99(7), 394-99.

Through interviews and videotaped data, this study documents the current state of readiness of (n=10) preservice middle grade teachers regarding their ability to plan, implement, and reflect on an integrated mathematics and science lesson.

Prsv, Tchg, IC (T, MS)

Boaler, Jo. (1999). Participation, knowledge and beliefs: A community perspective on mathematics learning. *Educational Studies in Mathematics*, 40(3), 259-81.

This study illustrates the use of a particular situated method of interpretation in the analysis of data from three-year case studies of two schools. The author analyzes various classroom incidents demonstrating the particular constraints and affordances of formalized mathematics classrooms.

Knw, Comm, Rsch (K-12)

Bolte, Linda A. (1999). Enhancing and assessing preservice teachers' integration and expression of mathematical knowledge. *Journal of Mathematics Teacher Education*, 2(2), 167-85.

The construction of concept maps and the writing of interpretive essays in mathematics courses for preservice and continuing teachers provide students with rich learning experiences. The investigator provides examples of the use of concepts maps and interpretive essays in teacher education.

Writ, TKnw, Prsv, Insv (TE)

Bowers, Janet; Cobb, Paul; McClain, Kay. (1999). The evolution of mathematical practices: A case study. *Cognition and Instruction*, 17(1), 25-64.

Presents a case study of third graders' development of place value conceptions to illustrate an approach for documenting students' mathematical development in the social context of the elementary school classroom. Documents the evolution of communal mathematical practices in which students participate and the development of individual understandings as they participate in evolving classroom practices.

PlcV, Comm, Soc, (EC)

Brenner, Mary E.; Herman, Sally; Ho, Hsiu-Zu; Zimmer, Jules M. (1999). Cross-national comparison of representational competence. *Journal for Research in Mathematics Education*, 30(5), 541-57.

This study compares sixth grade American students to three samples of Asian (Chinese, Japanese, and Taiwanese) sixth grade students to determine if the well-documented mathematical achievement of students from these Asian nations might be due in part to a greater understanding of mathematical representations.

CC, Rep (MS)

Bruno, Alicia; Martinon, Antonio. (1999). The teaching of numerical extensions: The case of negative numbers. *International Journal of Mathematical Education in Science and Technology*, 30(6), 789-809.

This article presents results of a study on teaching negative numbers. The study indicates the importance of previous ideas regarding positive numbers and how these ideas influence the knowledge of negative numbers.

A/S, NSns (EL)

Burton, Leone. (1999). The practices of mathematicians: What do they tell us about coming to know mathematics? *Educational Studies in Mathematics*, 37(2), 121-43.

The author interviewed research mathematicians with a focus on how they came to know mathematics. The article discusses how they understand their practices, locating them in the communities of which they claim membership, identifying the style that dominates their organization of research, and looking at their lived contradictions.

Phil, Lrng (PS)

Bussi, Maria G. Bartolini; Boni, Mara; Ferri, Franca; Garuti, Rossella. (1999). Early approach to theoretical thinking: Gears in primary school. *Educational Studies in Mathematics*, 39(1-3), 67-87.

This study describes a teaching experiment conducted with fourth grade students working with gears. The authors identify characteristics that have enabled pupils to approach theoretical thinking. The study offers early findings of the external level of interpersonal classroom processes and at the inner level of individual mental processes.

PS, Tchg, Clln (EC)

Carlson, Marilyn P. (1999). The mathematical behavior of six successful mathematics graduate students: Influences leading to mathematical success. *Educational Studies in Mathematics*, 40(3), 237-58.

This study investigates the mathematical behavior of graduate students and the experiences that contributed to their mathematical development and success. Students reported that a mentor facilitated the development of their problem-solving abilities and continued mathematical study.

PS, Lrng, Knw (PS)

Carr, Martha; Jessup, Donna L.; Fuller, Diana. (1999). Gender differences in first-grade mathematics strategy use: Parent and teacher contributions. *Journal for Research in Mathematics Education*, 30(1), 20-46.

This study examines how parents and teachers influence the development of gender differences in mathematics strategy use in the first grade. The findings reports that boys correctly used retrieval during the first grade more than girls and girls correctly used overt strategies more than boys.

Gend, Lrnr, Styl, A/S, Soc (EC)

Chaney-Cullen, Tammy; Duffy, Thomas M. (1999). Strategic teaching framework: Multimedia to support teacher change. *Journal of the Learning Sciences*, 8(1), 1-40.

This article describes and evaluates a technology source, Strategic Teaching Framework (STF), designed to support elementary school teachers in adopting a situated, constructivist approach to teaching mathematics. The authors discuss changes in teaching practices and the conceptualization of those changes.

Curr, Tech, MMed (EL, T)

Chapman, Olive. (1999). Inservice teacher development in mathematical problem solving. *Journal of Mathematics Teacher Education*, 2(2), 121-42.

This study describes a problem-solving-oriented teacher inservice program designed to allow elementary teachers to focus on personal experience as a way of achieving self understanding and a way of reconstructing their personal meanings about problem solving and problem-solving instruction.

PS, TBlf, Curr (TE, EL)

Chassapis, Dimitris. (1999). The mediation of tools in the development of formal mathematical concepts: The compass and the circle as an example. *Educational Studies in Mathematics*, 37(3), 275-93.

This investigation focuses on the process by which children develop a formal mathematical concept of the circle by using various instruments to draw circles. The author concludes that the use of the compass structures the circle-drawing operation in a radically different fashion than circle tracers and templates.

Geom, Matl, Meas (EL)

Chouinard, Roch; Vezeau, Carole; Bouffard, Therese; Jenkins, Brenda. (1999). Gender differences in the development of mathematics attitudes. *Journal of Research and Development in Education*, 32(3), 184-192.

Surveys of Canadian high school students indicated that for both genders, certain variables associated with mathematics success deteriorated as adolescence progressed. Younger girls experienced more mathematics anxiety and considered themselves less competent, but many such differences diminished with age for girls, and it appeared that deterioration of attitudes primarily affected boys.

Anx, Gend, Att, (HS)

Chroge, Carol A. (1999). Understanding the problem. *Ohio Journal of School Mathematics*, Sum, 2-10.

This inquiry describes the difficulties students have with word problems. The author concludes that a problem-solving approach to teaching mathematics and word problems is beneficial to student learning.

PS, Tchg (EL)

Clarke, Doug M. (1999). Classroom reform five years down the track: The experiences of two teachers. *Mathematics Education Research Journal*, 11(1), 4-24.

This study investigated changing teacher roles associated with innovative mathematics materials at the sixth-grade level. Findings suggest that the greatest changes relate to increasing comfort with posing non-routine problems to students and allowing them to struggle together.

Tchr, PS (MS)

Cleland, JoAnn V.; Wetzel, Keith A.; Zambo, Ron; Buss, Ray R.; Rillero, Peter. (1999). Science integrated with mathematics using language arts and technology: A model for collaborative professional development. *Journal of Computers in Mathematics and Science Teaching*, 18(2), 157-72.

This study focuses on three components critical to the success of multimedia-based technology: (1) linkage of pedagogy to technology; (2) collaborative teacher planning of instructional units; and (3) support during implementation to promote systemic change.

MMed, Insv, Plan, Tech (K-12)

Clements, Douglas H. (1999). Teaching length measurement: Research challenges. *School Science and Mathematics*, 99(1), 5-11.

This inquiry describes several studies that challenge conventional wisdom regarding the teaching and learning of nonstandard and standard unit, rulers, and measurement sense. The author discusses the educational implications of their results.

Meas, Revw, Curr (EL)

Clements, Douglas H.; Swaminathan, Sudha; Hannibal, Mary Anne Zeitler; Sarama, Julie. (1999). Young children's concepts of shape. *Journal for Research in Mathematics Education*, 30(2), 192-212.

The authors investigate the criteria preschool children use to distinguish members of a class of shapes from other figures by conducting individual clinical interviews of (n=97) children ages 3 to 6, emphasizing identification and descriptions of shapes and reasons for these identifications.

Rep, Geom (EC)

Cobb, Paul. (1999). Individual and collective mathematical development: The case of statistical data analysis. *Mathematical Thinking and Learning*, 1(1), 5-43.

This article clarifies how students' mathematical reasoning as acts of participation are analyzed in the mathematical practices established by the classroom community. The author presents episodes from a classroom teaching experiment that focused on statistics and discusses change, diversity, and equity.

Oral, Soc, PS, Stat (EL)

Cole, Karen A. (1999). Walking around: getting more from informal assessment. *Mathematics Teaching in the Middle School*, 4(4), 224-27.

The author describes a study done by the Middle School Math through Applications Project (MMAP) on informal assessment. The article discusses valuable techniques that MMAP teachers and researchers developed for organizing informal assessment and produces a coherent story of student progress.

CIIn, Assm, Oral (MS)

Cosgrave, John B. (1999). An introduction to number theory with talented youth. *School Science and Mathematics*, 99(6), 348-53.

This study details some of the work done in the first 3 of 6 days of teaching with a group of (n=16) young students. The author presents the work in the form of verbal exchanges whose aim is to present students with some challenging questions outside their normal classroom experience.

Gift, NSns, Oral (MS)

Croy, Marvin J. (1999). Graphic interface design and deductive proof construction. *Journal of Computers in Mathematics and Science Teaching*, 18(4), 371-85.

This study presented graphic means of representing deductive proofs in a sentential system of symbolic logic. The authors draw some general conclusions concerning the relevance of instructional programs for empirically documenting student difficulties and improving interface designs.

Comp, Prf, Vis (K-12)

De La Cruz, Yolanda. (1999). Reversing the trend: Latino families in real partnerships with schools. *Teaching Children Mathematics*, 5(5), 296-300.

This investigation outlines a research-based model for greater family involvement among Latino families in the area of mathematics. The author reports that parents remarked that they had never been given a choice of times for school-related activities and they felt like real partners in the learning and teaching of their children.

CC, TAtt, Soc (EL)

Doerr, Helen M.; Tripp, Joseph S. (1999). Understanding how students develop mathematical models. *Mathematical Thinking and Learning*, 1(3), 231-54.

The authors discuss findings from a study designed to characterize students' development of significant mathematical models by examining the shifts in their thinking that occur during problem investigations.

PS, Rep (EL)

Donoghue, Eileen F. (1999). The task-technique matrix: An alternative system for classifying research in mathematics education. *School Science and Mathematics*, 99(1), 42-46.

The investigator introduces a schema for classifying research in mathematics education that deepens and extends the Romberg/Bourne Model. Employs dual hierarchical systems, one related to the research task and the other to research technique.

Rsch (ALL)

Douek, Nadia. (1999). Argumentation and conceptualization in context: A case study on sunshadows in primary school. *Educational Studies in Mathematics*, 39(1-3), 89-110.

This study analyzes the individual and collective activities of fourth grade students while trying to explain a schoolfellow's mistake in the use of a geometrical schema for the sunshadows phenomenon.

CIIn, Geom, Rep (EC)

Edwards, Thomas G.; Hensien, Sarah M. (1999). Changing instructional practice through action research. *Journal of Mathematics Teacher Education*, 2(2), 187-206.

This inquiry describes an action research collaboration between a middle school mathematics teacher and a mathematics teacher educator in which the teacher wrote a narrative description of the collaboration and the changes she made in her instructional practice as a result of the collaboration.

Rsch, Tchg (T, MS)

Estepa, Antonio; Batanero, Carmen; Sanchez, F. T. (1999). Students' intuitive strategies in judging association when comparing two samples. *Hiroshima Journal of Mathematics Education*, 7, 17-30.

The authors present an experimental study of students' strategies and association judgments when faced with comparison of a numerical variable in two different samples. They classify the strategies from a mathematical standpoint to identify theorems in action and two types of misconceptions about association.

Styl, Msen (SE)

Fast, Gerald R. (1999). Analogies and reconstruction of probability knowledge. *School Science and Mathematics*, 99(5), 230-40.

This study investigated the effectiveness of utilizing analogies to effect conceptual change in students' alternative probability concepts. Results indicate that analogies can be effective in producing desired conceptual change in high school students' probability concepts.

Prob, PS (HS)

Fischbein, Efraim; Baltsan, Madlen. (1999). The mathematical concept of set and the 'collection' model. *Educational Studies in Mathematics*, 37(1), 1-22.

The authors hypothesize that various misconceptions held by students with regard to the mathematical set concept may be explained by the initial collection model. Study findings confirm the hypothesis.

Mscp, NSns, Lrng (EL)

Forgasz, Helen J.; Leder, Gilah C.; Gardner, Paul L. (1999). The Fennema-Sherman Mathematics as a Male Domain scale reexamined. *Journal for Research in Mathematics Education*, 30(3), 342-48.

This article discusses the Fennema-Sherman Mathematics Attitude Scales (MAS) which have been extensively used in research on gender differences in mathematics learning outcomes. The authors indicate that several items in the Mathematics as a Male Domain scale of MAS may no longer be valid.

Gend, Att, Rsch (K-12)

Forster, Patricia. (1999). Applying constructivist theory to practice in a technology-based learning environment. *Mathematics Education Research Journal*, 11(2), 81-93.

The authors describe a research study where constructivism was used as the rationale for the design, implementation, and evaluation of four technology-based investigations. The study indicates that for learning activities involving school assessment, many students chose not to work collaboratively.

Lrng, Tech, Grpg, Tchg (SE)

Fraivillig, Judith L.; Murphy, Lauren A.; Fuson, Karen C. (1999). Advancing children's mathematical thinking in Everyday Mathematics classrooms. *Journal for Research in Mathematics Education*, 30(2), 148-70.

This inquiry presents and describes a pedagogical framework that supports children's development of conceptual understanding of mathematics. The findings indicate that teachers often support but less often elicit or extend children's mathematical thinking.

TKnw, PS, Tchg (EL)

Gearhart, Maryl; Saxe, Geoffrey B.; Seltzer, Michael; Schlackman, Jonah; Ching, Cynthia Carter; Nasir, Na'ilah; Fall, Randy; Bennett, Tom; Rhine, Steven; Sloan, Tine F. (1999). Opportunities to learn fractions in elementary mathematics classrooms. *Journal for Research in Mathematics Education*, 30(3), 286-315.

This article addresses the questions of how documented opportunities to learn can be aligned with NCTM Standards, and how elementary teachers' efforts to provide such opportunities can be supported.

Frac, Curr, Tchg (EL, T)

Gellert, Uwe. (1999). Prospective elementary teachers' comprehension of mathematics instruction. *Educational Studies in Mathematics*, 37(1), 23-43.

This article reports a study that investigated prospective elementary teachers' knowledge and convictions regarding content, pedagogy, and pupil needs as well as their rationales for mathematics teaching. The author discusses results by way of confronting the school as a locus for serious learning.

TKnw, Tchg, TBlf (EL, T)

Gfeller, Mary K.; Niess, Margaret L.; Lederman, Norman G. (1999). Preservice teachers' use of multiple representations in solving arithmetic mean problems. *School Science and Mathematics*, 99(5), 250-57.

The authors examine solutions presented by preservice teachers for solving graphical and numerical problems involving the arithmetic mean. A significant difference was found between science and mathematics preservice teachers in the use of balancing deviations to solve problems, but not in the use of the computational algorithm.

PS, Rep, Arth (T)

Graham, Ted; Rowlands, Stuart; Jennings, Sue; English, John. (1999). Towards whole-class interactive teaching. *Teaching Mathematics and Its Applications*, 18(2), 50-60.

This study details the differences between teaching methods in Britain and Hungary. The authors propose the method of whole-class interactive teaching as a way to improve student achievement.

CC, Tchg, Soc (K-12)

Gutierrez, Angel; Jaime, Adela. (1999). Preservice primary teachers' understanding of the concept of altitude of a triangle. *Journal of Mathematics Teacher Education*, 2(3), 253-75.

This study describes the influence of two variables on preservice teachers' performance: (1) the presence of a formal definition; and (2) previous classroom activities that addressed the concept of the altitude of a triangle.

Prsv, Geom, TKnw (EL, T)

Hahn, Corinne. (1999). Proportionnalité et pourcentage chez des apprentis vendeurs. Réflexion sur la relation mathématiques/réalité dans une formation 'en alternance'. *Educational Studies in Mathematics*, 39(1-3), 229-49.

The author presents the results of a research study conducted with apprentices in order to examine the double hypothesis that vocational training incorporating work placement provides the opportunity to construct authentic situations out of the everyday practices of students.

RaPc, Soc (SE)

Haimes, David. (1999). Teachers' strategies for implementation of de-streaming in secondary mathematics classes. *Mathematics Education Research Journal*, 11(2), 94-108.

This study reports on the strategies adopted by a group of teachers in Ontario, Canada as they implemented de-streaming. The author indicates that teachers made special provisions for both low- and high-achieving students and employed a wide range of techniques for assessing student progress.

Tchg, Eqty (SE, T)

Halpin, Regina. (1999). A model of constructivist learning in practice: Computer literacy integrated into elementary mathematics and science teacher education. *Journal of Research on Computing in Education*, 32(1), 128-138.

This study compared preservice teachers' confidence to transfer computer applications into their classroom instruction depending on whether they were taught computer literacy from a theory perspective focusing on skills alone or from a theory and application perspective where their computer skills were learned simultaneously as they completed interdisciplinary mathematics and science projects.

TAtt, Comp, IC, (TE, EL)

Harrison, Nancy; Bergen, Carole. (1999). Mathematics for the liberal arts student: Pedagogical issues and strategies for a successful distance learning course. *Mathematics and Computer Education*, 33(1), 52-61.

This study addressed the development and delivery of an introductory level mathematics course for the liberal arts student over a Distance Learning Network. Discusses advisement guidelines for students, types of communication among students and between students and the instructor, and testing.

Tech, Curr, Comm (PS)

Hazzan, Orit. (1999). Reducing abstraction level when learning abstract algebra concepts. *Educational Studies in Mathematics*, 40(1), 71-90.

This study presents a theoretical framework on undergraduate students' ability to cope with abstract algebra concepts. The author indicates that students' responses can be interpreted as a result of reducing the level of abstraction.

Alg, PS, Lrnr (PS)

Healy, Lulu; Hoyles, Celia. (1999). Visual and symbolic reasoning in mathematics: Making connections with computers? *Mathematical Thinking and Learning*, 1(1), 59-84.

This study analyzed visual and symbolic strategies developed by students to express generalizations of number patterns and connections between them. The authors make suggestions as to how students might be encouraged to exploit visual reasoning alongside symbolic reasoning, and discuss implications for curriculum design.

Lrnr, Vis, Comp, NSns, Rep (K-12)

Heid, M. Kathleen; Blume, Glendon W.; Zbiek, Rose Mary; Edwards, Barbara S. (1999). Factors that influence teachers learning to do interviews to understand students' mathematical understandings. *Educational Studies in Mathematics*, 37(3), 223-49.

This study aims to empower mathematics teachers to use interviews to understand their students' mathematical understandings as well as to prepare them to use technology-intensive curricula.

Rsch, Tech, Tchg, Assm (TE)

Hiebert, James. (1999). Relationships between research and the NCTM standards. *Journal for Research in Mathematics Education*, 30(1), 3-19.

This article addresses the role that research should play in shaping standards by distinguishing between

values and research problems and by calibrating appropriate expectations for research. The review offers research contributions to current debates with brief summaries of some findings that are relevant to the standards set by the NCTM.

Impl, Rsch, Revw (K-12)

Hollar, Jeannie C.; Norwood, Karen. (1999). The effects of a graphing-approach intermediate algebra curriculum on students' understanding of function. *Journal for Research in Mathematics Education*, 30(2), 220-26.

The authors extend O'Callaghan's computer-intensive algebra study by using his component competencies and the process-object framework to investigate the effects of a graphing-approach curriculum employing the TI-82 graphing calculator. They conclude that students in the graphing-approach classes demonstrated significantly better understanding of functions.

Alg, GCal (SE)

Holton, Derek; Anderson, Julie; Thomas, Bronwen; Fletcher, David. (1999). Mathematical problem solving in support of the curriculum? *International Journal of Mathematical Education in Science and Technology*, 30(3), 351-71.

This study describes problem solving in secondary schools. The results suggest that positive results were achieved, in part, as a consequence of the time that was spent in problem-solving lessons which allowed students to practice reading and working with word problems at their own pace.

PS, Curr (SE)

Houdement, Catherine; Kuzniak, Alain. (1999). Un exemple de cadre conceptuel pour l'etude de l'enseignement de la geometrie en formation des maitres. *Educational Studies in Mathematics*, 40(3), 283-312.

This study outlines a conceptual framework that organizes geometry into three kinds of knowledge: (1) intuition; (2) experience; and (3) deduction. The authors illustrate their conceptual frame with examples of geometry teaching with primary school students.

Geom, Rsch (EL)

Inagaki, Kayoko; Morita, Eiji; Hatano, Giyoo. (1999). Teaching-learning of evaluative criteria for mathematical arguments through classroom discourse: A cross-national study. *Mathematical Thinking and Learning*, 1(2), 93-111.

Analsis of videotaped lessons of 5th grade students on equivalent fractions from seven American and six Japanese classrooms found two approaches to the teaching-learning of the criteria for evaluating mathematical arguments.

Oral, CC, Prf, Frac (MS)

Jervis, Alan; Steeg, Torben. (1999). Internet-based resources--really useful? *Teaching Mathematics and Its Applications*, 18(3), 106-14.

This article summarizes recent research into patterns of Internet use in schools providing detailed pictures which suggest that, in the majority of schools, the use of the Internet is at a very early and restricted level of use.

Tech, Comp, Tchg (SE)

Jones, Graham A.; Langrall, Cynthia W.; Thornton, Carol A.; Mogill, A. Timothy. (1999). Students' probabilistic thinking in instruction. *Journal for Research in Mathematics Education*, 30(5), 487-519.

This investigation evaluated the thinking of third grade students in relation to an instructional program in probability that was informed by a research-based framework that included a description of students' probabilistic thinking. The authors reveal that overcoming misconceptions and applying both part-part and part-whole reasoning were key patterns in producing growth in probabilistic thinking.

Prob, Styl (EC)

Kalchman, Mindy; Case, Robbie. (1999). Diversifying the curriculum in a mathematics classroom streamed for high-ability learners: A necessity unassumed. *School Science and Mathematics*, 99(6), 320-29.

A study of two groups of high-ability eighth grade male students exploring different kinds of functions independently using computer graphing technology found that students in the treatment group scored higher than students in the text-based typical control group.

Comp, Gift, Alg (MS)

Kamii, Constance; Ozaki, Kyoko. (1999). Abstraction and representation in arithmetic: A Piagetian view. *Hiroshima Journal of Mathematics Education*, 7, 1-15.

This article shares the results of a study in which (n=204) first grade students were interviewed. The authors interpret the findings in light of Piaget's emphasis on abstraction. They conclude that children represent ideas at their respective levels of abstraction.

Arth, Rep (EC)

Kawanaka, Takako; Stigler, James W. (1999). Teachers' use of questions in eighth-grade mathematics classrooms in Germany, Japan, and the United States. *Mathematical Thinking and Learning*, 1(4), 255-78.

This study investigated the questions that 8th-grade mathematics teachers in Germany, Japan, and the United States pose to their students.

Oral, CC (SE, T)

Kieran, Carolyn; Sfard, Anna. (1999). Seeing through symbols: The case of equivalent expressions. *FOCUS on Learning Problems in Mathematics*, 21(1), 1-17.

This study presents a teaching experiment to turn students from external observers into active participants where students use graphs to build meaning for equivalence of algebraic expressions. The investigators conclude that the graphic-functional approach seems to make the introduction to algebra more meaningful for the learner.

Alg, Vis, Rep (SE)

Kimmel, Howard; Deek, Fadi P.; Farrell, Mary L.; O'Shea, Mark. (1999). Meeting the needs of diverse student populations: Comprehensive professional development in science, math, and technology for teachers of students with disabilities. *School Science and Mathematics*, 99(5), 241-49.

The authors describe a model of professional development designed to improve the skills and knowledge of teams of special education and regular education teachers in science, mathematics, and technology instruction. The program led to the development of coping skills and persistence in science and mathematics teaching for all students.

Insv, Eqty, LD, Tech (T, K-12)

LaBerge, Victoria Boller; Sons, Linda R. (1999). First-year teachers' implementation of the NCTM standards. *PRIMUS*, 9(2), 139-56.

This study considers the extent that first-year teachers (FYTs) were able to implement the Standards in their teaching, the barriers to the FYTs implementation of the Standards, factors contributing to their success, and the implications for mathematics teacher education programs.

Tchg (TE)

Lang, Xia. (1999). CAI and the reform of calculus education in China. *International Journal of Mathematical Education in Science and Technology*, 30(3), 399-404.

This study provides an overview of recent changes in calculus education at Chinese colleges and universities. The article focuses on the changes parallel to the development of computer assisted instruction (CAI) technology and software.

CAI, Soc, Calc (PS)

Langford, Karen; Huntley, Mary Ann. (1999). Internships as commencement: Mathematics and science research experiences as catalysts for preservice teacher professional development. *Journal of Mathematics Teacher Education*, 2(3), 277-99.

This article describes the Maryland Collaborative for Teacher Preparation (MCTP) internship program, including the rationale for and structural features of the program. The authors highlight the effects of the internship experience on preservice teachers' conceptions and beliefs.

Prsv, TAtt, TBlf (TE)

Li, Qing. (1999). Teachers' beliefs and gender differences in mathematics: A review. *Educational Research*, 41(1), 63-76.

A literature review indicated that teachers have different beliefs about male and female students, tend to stereotype math as male, overrate males' math capability, and have higher expectations for males. These beliefs were found in both male and female teachers, though there were some nuances.

Revw, TBlf, Gend, (K-12, T)

Linchevski, Liora; Williams, Julian. (1999). Using intuition from everyday life in 'filling' the gap in children's extension of their number concept to include the negative numbers. *Educational Studies in Mathematics*, 39(1-3), 131-47.

This article reports on an instructional method designed to address the cognitive gaps in children's mathematical development where operational conceptions give rise to structural conceptions. The authors discuss the transformation of outside-school knowledge to school mathematics.

NSns, Rep, Tchg (EL)

Lindsay, Martin. (1999). Designing assessment tasks to accommodate students' cognitive skills in a technology-based mathematics course. *International Journal of Mathematical Education in Science and Technology*, 30(5), 691-97.

This study describes investigative choices made and strategies used by students to solve problems in classrooms that provided access to a computer algebra

system (CAS). The author reports that technology-neutral mathematics questions were attempted by approximately equal numbers of students using CAS and traditional paper and pencil.

Alg, Comp, Styl (SE)

Lloyd, Gwendolyn M. (1999). Two teachers' conceptions of a reform-oriented curriculum: Implications for mathematics teacher development. *Journal of Mathematics Teacher Education*, 2(3), 227-52.

This article describes two high school teachers' conceptions of the cooperation and exploration components of a reform-oriented mathematics curriculum. The author indicates that each teacher attributed difficulties with students' cooperative work to the amount of structure and direction offered by the problems.

Grpg, Curr, TBlf (SE, T)

Loucks-Horsley, Susan; Matsumoto, Carolee. (1999). Research on professional development for teachers of mathematics and science: The state of the scene. *School Science and Mathematics*, 99(5), 258-71.

This article discusses research on the contexts, processes, strategies, and structures in which professional development is effective and, in some cases, able to demonstrate a link to improved student learning.

Insv, Soc, Tchg, Lrng (TE)

Lowrie, Tom. (1999). Developing children's mathematical power. *Australian Primary Mathematics Classroom*, 4(2), 8-11.

This article describes the range of processes used by preschool children engaged in solving non-routine mathematics problems. The author discusses how it can be told when children are thinking mathematically.

PS (EC)

Luft, Julie A.; Ebert-May, Diane. (1999). One state's self-study of initial certification programs in science and mathematics. *School Science and Mathematics*, 99(3), 124-32.

This article describes how mathematics and science education specialists in Arizona examined their programs to determine avenues for reform. The authors conclude that various components of initial certification programs may not be consistent with national reforms in mathematics, science, and teacher education.

Curr, Plan, Prsv (TE)

Ma, Xin. (1999). Dropping out of advanced mathematics: The effects of parental involvement. *Teachers College Record*, 101(1), 60-81.

Data from the Longitudinal Study of American Youth indicated that mathematics participants had higher socioeconomic status than dropouts at every grade level, that gender, attitude, and achievement affected mathematics participation, and that different types of parental involvement had different effects on mathematics participation.

Ach, Soc, Gend, Att (SE)

Ma, Xin. (1999). A meta-analysis of the relationship between anxiety toward mathematics and achievement in mathematics. *Journal for Research in Mathematics Education*, 30(5), 520-40.

This review examines 26 studies on the relationship between anxiety toward mathematics and achievement in mathematics among elementary and secondary students. The author indicates that the relationship is consistent across gender groups, grade-level groups, ethnic groups, instruments measuring anxiety, and years of publication.

Revw, Ach, Anx (ALL)

Maccini, Paula; McNaughton, David; Ruhl, Kathy L. (1999). Algebra instruction for students with learning disabilities: Implications from a research review. *Learning Disability Quarterly*, 22(2), 113-126.

A review of six published studies on algebra interventions for students with learning disabilities revealed that successful interventions included instruction on domain-specific knowledge, as well as general problem-solving and self-regulation strategies. Promising practices include sequential introduction of work problems through concrete, semiconcrete, and abstract phases, and peer feedback.

Alg, D/R, LD, PS (K-12)

MacGregor, Mollie; Price, Elizabeth. (1999). An exploration of aspects of language proficiency and algebra learning. *Journal for Research in Mathematics Education*, 30(4), 449-67.

The authors investigated whether three cognitive components of language proficiency--metalinguistic awareness of symbol, syntax, and ambiguity--are associated with students' success in learning algebraic notation. Results indicate that very few students with low metalinguistic awareness scores achieved high algebra scores.

Alg, Lang (SE)

Manoucherhri, Azita. (1999). Computers and school mathematics reform: Implications for mathematics teacher education. *Journal of Computers in Mathematics and Science Teaching*, 18(1), 31-48.

This investigation offers an understanding of the basis for teachers' decisions regarding the use of computers. The author reports that the teachers did not use computers for purposes other than drill and practice.

CAI, Tchg (K-12)

McShea, Betsy; Yarnevich, Maureen. (1999). The effects of a summer mathematics enrichment program on Hispanic mathematical achievement. *Journal of Women and Minorities in Science and Engineering*, 5(2), 175-81.

This study determined the effects of the National Society of Hispanic Masters of Business Administration's (NSHMBA) Summer Enrichment Program on Hispanic students' PSAT scores and general achievement in high school mathematics.

Ach, Ethn, Curr (HS)

Meel, David E. (1999). Email dialogue journals in a college calculus classroom: A look at the implementation and benefits. *Journal of Computers in Mathematics and Science Teaching*, 18(4), 387-413.

This study concerned the use of dialogue journal writing in a college-level Calculus 1 course. The author identifies how: (a) e-mail dialogue journals provided a viable means of contact; (b) students benefited from asking questions; and (c) the instructor received frequent feedback for course improvement.

Writ, Calc, Tech (PS)

Merriweather, Michelle; Tharp, Marcia L. (1999). The effect of instruction with graphing calculators on how general mathematics students naturalistically solve algebraic problems. *Journal of Computers in Mathematics and Science Teaching*, 18(1), 7-22.

This study focuses on changes in attitude toward mathematics and calculator use and changes in how general mathematics students naturalistically solve algebraic problems. The investigators conclude that rule-based students used an equation to solve the algebraic word problem whereas non-rule-based students used a numeric method.

GCal, Styl, Att, Alg (SE)

Mewborn, Denise S. (1999). Reflective thinking among preservice elementary mathematics teachers. *Journal for Research in Mathematics Education*, 30(3), 316-41.

The author studies four preservice elementary teachers during a field-based mathematics methods course to investigate elements of mathematics teaching and learning that teachers found problematic and how they resolved those problems. Findings suggest that teachers exhibited concerns about classroom context, pedagogy of mathematics, children's mathematical thinking, and mathematics content.

Prsv, Grpg, TKnw, Oral (T, EL)

Middleton, James A. (1999). Curricular influences on the motivational beliefs and practice of two middle school mathematics teachers: A follow-up study. *Journal for Research in Mathematics Education*, 30(3), 349-58.

This study examined the structures of two teachers' beliefs about what makes mathematics intrinsically motivating and provides representations of their beliefs. Results indicate that the teachers became more attuned to the conceptual complexity and challenge of mathematics activities and placed less emphasis on task ease.

TAtt, Curr, TBlf (TE, MS)

Middleton, James A.; Spanias, Photini A. (1999). Motivation for achievement in mathematics: Findings, generalizations, and criticisms of the research. *Journal for Research in Mathematics Education*, 30(1), 65-88.

This study examines recent research on motivation in mathematics education and discusses findings from research perspectives in this domain. The authors note that consistencies across research perspectives suggest a set of generalizable conclusions about the contextual factors, cognitive processes, and benefits of interventions that affect attitudes.

Ach, Att, Revw, Impl (ALL)

Miller, Kenneth W.; Davison, David M. (1999). Paradigms and praxis: The role of science and mathematics integration. *Science Educator*, 8(1), 25-29.

This study examines changes advocated in mathematics and science education standards documents to determine their impact on school science and mathematics curricula, integration, and corresponding practices. Findings suggest that complete integration of science and mathematics curricula is often not realized.

IC, Tchg (K-12)

Milou, Eric. (1999). The graphing calculator: A survey of classroom usage. *School Science and Mathematics*, 99(3), 133-40.

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This study investigates secondary mathematics teachers' use of the graphing calculator in their classrooms. Results indicate that the use of the graphing calculator is still controversial to many algebra teachers.

GCal, TAtt, Alg (SE, T)

Mingus, Tabitha T.Y.; Grassl, Richard M. (1999). What constitutes a nurturing environment for the growth of mathematically gifted students? *School Science and Mathematics*, 99(6), 286-93.

This article describes a qualitative study designed to describe the influential forces in the development of mathematically gifted students. The authors use interviews and an attitude survey to determine the sources of influence in the lives of gifted students.

Gift, Lrnr (K-12)

Mingus, Tabitha T.Y.; Grassl, Richard M. (1999). Preservice teacher beliefs about proofs. *School Science and Mathematics*, 99(8), 438-44.

This study explores the backgrounds, beliefs, and attitudes of teachers (n=51) about proofs. The author examines four issues: (1) preservice teachers' experiences/exposure to proof; (2) their beliefs about what constitutes proof; (3) the role of proof in mathematics; and (4) their beliefs about when proof should be introduced.

Prf, TAtt, TBlf, Tchg, TKnw (T)

Molyneux-Hodgson, Susan; Rojano, Teresa; Sutherland, Rosamund; Ursini, Sonia. (1999). Mathematical modelling: The interaction of culture and practice. *Educational Studies in Mathematics*, 39(1-3), 167-83.

This article analyzes the results of a Mexican/British project that used the sociocultural approach to investigate ways in which mathematics is used in the practice of school science and the role of spreadsheets as a mathematical modeling tool.

Comp, Rep, Soc (SE)

Moreno, Susan E.; Muller, Chandra; Asera, Rose; Wyatt, Lisa; Epperson, James. (1999). Supporting minority mathematics achievement: The emerging scholars program at the University of Texas at Austin. *Journal of Women and Minorities in Science and Engineering*, 5(1), 53-66.

The Emerging Scholars Program (ESP) at the University of Texas at Austin is designed to increase the achievement of minorities and women in calculus. Research on the ESP indicates that it is possible to create a diverse academic setting in which all participants--majority and minority--appear to benefit.

Eqty, Calc, Gend, Soc (PS)

Morris, Anne K. (1999). Developing concepts of mathematical structure: Pre-arithmetic reasoning versus extended arithmetic reasoning. *FOCUS on Learning Problems in Mathematics*, 21(1), 44-72.

This study examined students' understanding of the quantitative relationships, operations, and properties of relationships and operations that are introduced in arithmetic and beginning algebra courses. The author develops alternative approaches to the teaching of structure such as the structural-to-computational model and the procedural-to-structural model.

NSns, Alg, Arth, Curr (SE)

Moschkovich, Judit N. (1999). Students' use of the x-intercept as an instance of a transitional conception. *Educational Studies in Mathematics*, 37(2), 169-97.

The author uses an evolutionary perspective of conceptual change to consider a conception in the domain of linear functions. The findings summarize the results of the written assessments and present an analysis of the discussions for two pairs of students to show that the use of the x-intercept can be framed as a transitional conception.

Rep (SE)

Nicol, Cynthia. (1999). Learning to teach mathematics: Questioning, listening, and responding. *Educational Studies in Mathematics*, 37(1), 45-66.

This study explored prospective teachers' learning to teach mathematics in the complex context of a university-based curriculum and instruction course. The investigators conclude that the difficulties and tensions prospective teachers face in turn pose challenges and tensions for teacher educators.

Prsv, TKnw, Tchr (K-12, TE)

Noss, Richard. (1999). Learning by design: Undergraduate scientists learning mathematics. *International Journal of Mathematical Education in Science and Technology*, 30(3), 373-88.

This inquiry starts with the premise that simultaneous study of design and learning together may throw light on epistemological and psychological issues in learning mathematics. The author studied undergraduate science students and revealed a complex relationship between design and learning.

Curr, Phil (PS)

Nunez, Rafael E.; Edwards, Laurie D.; Matos, Joao Filipe. (1999). Embodied cognition as grounding for situatedness and context in mathematics education. *Educational Studies in Mathematics*, 39(1-3), 45-65.

This study explores why learning and cognition are situated and context-dependent from the perspective of 'Embodied Cognition'. The authors argue that the nature of situated learning and cognition cannot be fully understood by focusing only on social, cultural, and contextual factors.

Lrng, Soc, Ethn (K-12)

O'Brien, Virginia; Martinez-Pons, Manual; Kopala, Mary. (1999). Mathematics self-efficacy, ethnic identity, gender, and career interests related to mathematics and science. *Journal of Educational Research*, 92(4), 231-235.

Researchers surveyed 11th graders to examine the relations among mathematics self-efficacy, gender, ethnic identity, and career interests in mathematics and science. Researchers also examined socioeconomic status and academic achievement.

Blf, Gend, Ethn, (HS)

Olive, John. (1999). From fractions to rational numbers of arithmetic: A reorganization hypothesis. *Mathematical Thinking and Learning*, 1(4), 279-314.

This study of two children working in the context of specially developed computer microworlds indicates that the operations and unit types associated with the children's whole-number conceptual development contributed to knowledge in fraction development.

NSns, Comp, Frac, Lrnr (EL)

Palis, Gilda de La Rocque. (1999). Let's ask "why?" after "what if?". *Journal of Computers in Mathematics and Science Teaching*, 18(4), 415-37.

This author designed a set of spreadsheet-supported activities to examine how preservice and inservice teachers behave in an exploratory computer setting, thus providing clues capable of informing the design of other learning opportunities using this technological tool.

Comp, Tchr (EL, T)

Papick, Ira J.; Beem, John K.; Reys, Barbara J.; Reys, Robert E. (1999). Impact of the Missouri Middle Mathematics Project on the preparation of prospective middle school teachers. *Journal of Mathematics Teacher Education*, 2(3), 301-10.

This article describes a program for prospective middle school mathematics teachers as part of the Missouri Middle Mathematics Project (MMMP). The authors provide information about middle grades mathematics certification.

Prsv, Curr (TE, MS)

Pehkonen, Erkki. (1999). Conceptions and images of mathematics professors on teaching mathematics in school. *International Journal of Mathematical Education in Science and Technology*, 30(3), 389-97.

This investigation clarifies what kind of mathematical beliefs are conveyed to student teachers during their teacher preparation years. The author interviewed mathematics professors (n=7) from five Finnish universities who were responsible for mathematics teacher education.

Att, TBlf (PS)

Perry, Bob; Howard, Peter; Tracey, Danielle. (1999). Head mathematics teachers' beliefs about the learning and teaching of mathematics. *Mathematics Education Research Journal*, 11(1), 39-53.

This article reports an investigation of (n=40) teacher beliefs concerning the nature of mathematics and the learning and teaching of mathematics.

TBlf, Tchg, Lrng (SE)

Pourdavood, Roland G. (1999). Toward a better understanding of mathematics teacher change: A case study of four preservice secondary mathematics teachers. *Ohio Journal of School Mathematics*, Sum, 11-24.

This investigation examined reflexive relationships among a dialogic community of preservice teachers, existing classroom norms during field experience, cooperating teachers' methods of instruction, and preservice teachers' beliefs and classroom practices.

TAtt, Tchg, Prsv (SE, T)

Putt, Ian J.; Jones, Graham A.; Thornton, Carol A.; Langrall, Cynthia W.; Mooney, Edward S.; Perry, Bob. (1999). Young students' informal statistical knowledge. *Teaching Statistics*, 21(3), 74-78.

This article reports the results of an informal study of young children's reactions to some visual displays of data.

Vis, Stat (EC)

Reys, Robert; Reys, Barbara; McIntosh, Alistair; Emanuelsson, Göran; Johansson, Bengt; Yang, Der Ching. (1999). Assessing number sense of students in Australia, Sweden, Taiwan, and the United States. *School Science and Mathematics*, 99(2), 61-70.

This inquiry reports selected findings from a study of number sense proficiency in students aged 8-14 years in Australia, Sweden, the United States, and Taiwan. The authors comment on the meaning and importance of number sense, the development of the assessment instruments, and student responses to the items.

NSns, CC, Tchg (K-12)

Roberts, Dana L.; Stephens, Larry J. (1999). The effect of the frequency of usage of computer software in high school geometry. *Journal of Computers in Mathematics and Science Teaching*, 18(1), 23-30.

This investigation compares students of average ability in three high school geometry classes that utilized computer software in varying amounts. The findings suggest that using computer software may not be beneficial when teaching certain topics in geometry and that using computer software did improve student interest and participation.

Comp, Geom, Att (HS)

Roberts, Lyn. (1999). Using concept maps to measure statistical understanding. *International Journal of Mathematical Education in Science and Technology*, 30(5), 707-17.

This study examined the use of concept maps to measure tertiary science students' understanding of fundamental concepts in statistical inference. The author concludes that valuable qualitative information can be gained from an investigation of student concept maps.

Stat, Assm (SE)

Royster, David C.; Harris, M. Kim; Schoeps, Nancy. (1999). Dispositions of college mathematics students. *International Journal of Mathematical Education in Science and Technology*, 30(3), 317-33.

This study considers the attitudes and beliefs of college students in mathematics courses towards mathematics. The authors classify students according to variables such as academic major, mathematical background, and gender.

Att, Gend, Blf (PS)

Schmidt, Mary Ellen. (1999). Middle grade teachers' beliefs about calculator use: Pre-project and two years later. *FOCUS on Learning Problems in Mathematics*, 21(1), 18-34.

This inquiry reports on the effects of a project focused on calculator use in middle grade mathematics and compares teachers' beliefs about calculator use before the project to their beliefs two years after participating in the project.

TBlf, Chr (MS, T)

Schuck, Sandy. (1999). Teaching mathematics: A brightly wrapped but empty gift box. *Mathematics Education Research Journal*, 11(2), 109-23.

This study investigated first-year secondary school teachers' beliefs about and attitudes toward mathematics. The study finds that prospective teachers generally perceived good mathematics teaching to include the provision of enjoyable experiences.

TAtt, TBlf, Insv (SE, T)

Senger, Elizabeth Smith. (1999). Reflective reform in mathematics: The recursive nature of teacher change. *Educational Studies in Mathematics*, 37(3), 199-221.

This study examines teachers' inner reflections and exterior manifestations as they participated in a mathematics reform effort. They describe the analysis of three elementary mathematics teachers as they struggled with issues of reform and traditional teaching in relation to personal values and beliefs.

TBlf, Tchr, Curr (TE)

Sharpe, Norean Radke; Sonnert, Gerhard. (1999). Proportions of women faculty and students in the mathematical sciences: A trend analysis by institutional group. *Journal of Women and Minorities in Science and Engineering*, 5(1), 17-27.

This investigation examined how gender proportions of faculty and undergraduate majors in the mathematical sciences vary across institutional groups and how these proportions have changed over time.

Gend, Eqty (PS)

Shaw, C.T.; Shaw, V.F. (1999). Attitudes of engineering students to mathematics--A comparison across universities. *International Journal of Mathematical Education in Science and Technology*, 30(1), 47-63.

The authors survey engineering students' attitudes toward mathematics in three different United Kingdom universities. Students recorded significantly different responses to many of the questions posed including their university, gender, home or overseas status, and mathematics qualification on entry to university.

Att, Gend, CC (PS)

Sherman, Sharon; Weber, Robert. (1999). Using technology to strengthen mathematics and science instruction in elementary and middle schools. *Journal*

of Women and Minorities in Science and Engineering, 5(1), 67-78.

This study investigated whether the study of technology could strengthen instruction in mathematics and science in the elementary and middle schools, especially for women and underrepresented groups. Findings indicate that students could construct knowledge of mathematics and science through the use of design and problem solving in technology.

Tech, PS, Gend (EL, MS)

Shotsberger, Paul G. (1999). The instruct project: Web professional development for mathematics teachers. *Journal of Computers in Mathematics and Science Teaching*, 18(1), 49-60.

This study reports on the implementation of a World Wide Web site for teacher professional development. Highlights three specific ways in which teachers can benefit from the Web: (1) consistent opportunities for reflection; (2) shortened cycle for training, implementation and evaluation; and (3) teacher empowerment.

Tech, Insv, TAtt (TE)

Silver, Jennifer Williams. (1999). A survey on the use of writing-to-learn in mathematics classes. *Mathematics Teacher*, 92(5), 388-89.

This study reports the results of a survey of mathematicians about their teaching background, pedagogical philosophy, and degree to which they use discovery methods and expressive writing assignments, including journal writing, creating mathematical word problems, and writing term papers.

Writ, Tchr (T, SE)

Simon, Martin A.; Tzur, Ron. (1999). Explicating the teacher's perspective from the researchers' perspectives: Generating accounts of mathematics teachers' practice. *Journal for Research in Mathematics Education*, 30(3), 252-64.

The authors articulate methodology for studying mathematics teacher development in the context of reform. They offer an approach to understanding teachers' current practices and viewing their current practices in the context of development towards envisioned reforms.

Insv, TKnw, Tchg (TE)

Slavit, David. (1999). The role of operation sense in transitions from arithmetic to algebraic thought. *Educational Studies in Mathematics*, 37(3), 251-74.

This study presents and investigates a theoretical perspective on the development of understandings of mathematical operations with a particular focus on addition. The author reports on a case study and concludes that his attainment of aspects of operation sense supported transitions into algebraic ways of thinking.

Alg, Arth (EL)

Slavit, David; Yeidel, Joshua. (1999). Using web-based materials in large-scale precalculus instruction. *International Journal of Computers for Mathematical Learning*, 4(1), 27-50.

This article outlines an attempt at integrating web-based activities into a precalculus course at a large university in which discussion of the development of the activities is initially provided. Investigates the effects of the use these activities in four classrooms.

Tech, Calc (PS)

Sons, Linda. (1999). Student beliefs about math. *Illinois Mathematics Teacher*, 50(1), 3-6,28.

The author studied the beliefs of entering freshmen and identified differences in beliefs between the general population and two special groups, those admitted through special projects programs and those who chose to enroll in the university's core competency in mathematics.

Blf, Soc (PS)

Spillane, James P.; Zeuli, John S. (1999). Reform and teaching: exploring patterns of practice in the context of national and state mathematics reforms. *Educational Evaluation and Policy Analysis*, 21(1), 1-27.

Researchers investigated mathematics practices of 25 elementary and middle school teachers in the context of national and state efforts to reform mathematics education and identified distinctly different patterns of practice in response to the reforms and dimensions of practice that appear more responsive to reforms than others.

Tchg, (EL, MS, T)

Springer, Leonard; Donovan, Samuel S.; Stanne, Mary Elizabeth. (1999). Effects of small-group learning on undergraduates in science, mathematics, engineering, and technology: A meta-analysis. *Review of Educational Research*, 69(1), 21-51.

A meta-analysis of 39 studies on undergraduate science, mathematics, engineering, and technology education since 1980 demonstrates that various

forms of small-group learning promote achievement, improve attitudes toward learning, and increase persistence in these fields.

Grpg, Att. (PS)

Stacey, Kaye; MacGregor, Mollie. (1999). Taking the algebraic thinking out of algebra. *Mathematics Education Research Journal*, 11(1), 25-38.

This article demonstrates a change in the goals of teaching the algebra of equation-solving in Victoria, Australia that requires a transition from a way of solving problems in arithmetic to a conceptually new algebraic way.

Alg, PS (SE)

Steele, Marcee M.; Steele, John W. (1999). Discover: An intelligent tutoring system for teaching students with learning difficulties to solve word problems. *Journal of Computers in Mathematics and Science Teaching*, 18(4), 351-59.

This study examined DISCOVER, an intelligent tutoring system, that teaches students about word problems with less failure and frustration.

LD, Comp, PS (EL)

Stephens, Larry J.; Konvalina, John. (1999). The use of computer algebra software in teaching intermediate and college algebra. *International Journal of Mathematical Education in Science and Technology*, 30(4), 483-88.

This study compares two groups of students in an intermediate algebra course and two groups of students in a college algebra course with regard to the use/non-use of computer algebra software. The authors indicate that in both courses students using the software outperformed the students not using the software.

Alg, Comp, Lrng (SE, PS)

Stump, Sheryl. (1999). Secondary mathematics teachers' knowledge of slope. *Mathematics Education Research Journal*, 11(2), 124-44.

This investigation of secondary mathematics teachers' concept definitions, mathematical understanding, and pedagogical content knowledge of slope indicates that geometric ratios dominated teachers' concept definitions of slope, and teachers' descriptions of classroom instruction included physical situations more often than functional situations.

Alg, TKnw, Geom, Rep (SE, T)

Tirosh, Dina; Stavy, Ruth. (1999). Intuitive rules: A way to explain and predict students' reasoning. *Educational Studies in Mathematics*, 38(1-3), 51-66.

Students react similarly to a wide variety of conceptually unrelated situations. This article describes a rule that is manifested when two systems are equal with respect to a certain quantity A, but differ in another quantity B.

Msen, PS (K-12)

Tobias, Sheila. (1999). Some recent developments in teacher education in mathematics and science: A review and commentary. *Journal of Science Education and Technology*, 8(1), 21-31.

The author reviews the history and politics of teacher education and underscores the twin goals of achieving program coherence and higher standards. She compares the place of mathematics education in mathematics departments with that of science education and science.

Revw, Prsv (K-12, PS)

Tsamir, Pessia; Tirosh, Dina. (1999). Consistency and representations: The case of actual infinity. *Journal for Research in Mathematics Education*, 30(2), 213-19.

The authors demonstrate how research-based knowledge of students' incompatible solutions to various representations of the same problem could be used to raise their awareness of inconsistencies in their reasoning.

PS, Knw, Rep (SE)

Tzur, Ron. (1999). An integrated study of children's construction of improper fractions and the teacher's role in promoting that learning. *Journal for Research in Mathematics Education*, 30(4), 390-416.

This inquiry examines the co-emergence of teaching and children's construction of specific conceptions that support the generation of improper fractions in a constructivist teaching experiment with two fourth grade students posing and solving tasks in a computer microworld.

Frac, PS, Comp (EC)

Vacc, Nancy Nesbitt; Bright, George W. (1999). Elementary preservice teachers' changing beliefs and instructional use of children's mathematical thinking. *Journal for Research in Mathematics Education*, 30(1), 89-110.

This study examines changes in preservice elementary teachers' beliefs about teaching and learning

mathematics and their ability to provide mathematics instruction that is based on children's thinking. The investigators report that after participants were introduced to Cognitively Guided Instruction (CGI), significant changes in their beliefs and perceptions about mathematics instruction occurred.

TBlf, Lrnr, Tchg (EL, T)

Verschaffel, Lieven; De Corte, Erik; Lasure, Sabien; Van Vaerenbergh, Griet; Bogaerts, Hedwig; Ratinckx, Elie. (1999). Learning to solve mathematical application problems: A design experiment with fifth graders. *Mathematical Thinking and Learning*, 1(3), 195-229.

The authors developed and tested a learning environment for teaching and learning mathematical application problems. The study indicated that the intervention had a positive effect on different aspects of pupils' mathematical modeling and problem-solving abilities.

PS, Tchg, Curr (MS)

Verschaffel, Lieven; De Corte, Erik; Vierstraete, Heidi. (1999). Upper elementary school pupils' difficulties in modeling and solving nonstandard additive word problems involving ordinal numbers. *Journal for Research in Mathematics Education*, 30(3), 265-85.

This inquiry examines the scope and nature of upper elementary school pupils' difficulties with modeling and solving nonroutine additive word problems. The findings suggest that many errors result from the superficial, stereotyped approach of adding or subtracting two given numbers without considering the relation to the problem context.

PS, A/S, Rep, Lrng (EL)

Walen, Sharon; Williams, Steven; Barton, Hylie. (1999). Dollars and sense: A case of distributed cognition in a problem-solving session. *Mathematics Education Research Journal*, 11(1), 54-69.

The authors present a report that provides an example of a problem-solving session that goes beyond peer tutoring or cooperative breaking up of problems to focus on knowledge construction of a truly collaborative nature.

PS, CIIn, Grpg (K-12)

Watson, Jane M.; Moritz, Jonathan B. (1999). The beginning of statistical inference: Comparing two data sets. *Educational Studies in Mathematics*, 37(2), 145-68.

The authors explore the development of students' (n=88) understanding of comparing two data sets through the responses of students in individual interview settings. Strategies observed within the developmental cycles were visual, numerical, or a combination of the two.

Stat, Rep (K-12)

Wedege, Tine. (1999). To know or not to know--Mathematics, that is a question of context. *Educational Studies in Mathematics*, 39(1-3), 205-27.

This article discusses two analytic concepts--situated learning and habitus--and their suitability for analyzing adults' knowing or not-knowing mathematics in different situation contexts by interpreting a 75-year-old woman's account of her life concerning her attitudes toward mathematics.

Soc, Att, Pers (PS)

Wheeler, J. L.; Regian, J. W. (1999). The use of a cognitive tutoring system in the improvement of the abstract reasoning component of word problem solving. *Computers in Human Behavior*, 15(2), 243-254.

This article describes a study of ninth-grade students that evaluated the ability of the Word Problem Solving Tutor, a cognitive tutoring system, to improve the abstract-reasoning component of word-problem solving.

PS, Comp, (SE)

Wood, Terry. (1999). Creating a context for argument in mathematics class. *Journal for Research in Mathematics Education*, 30(2), 171-91.

The author reports on an 18-month investigation of a teacher's actions during class discussions in a second grade classroom in which student disagreement was resolved by argumentation. She concludes that teachers need to understand the complex social relationships in their classrooms.

CIIn, Oral, Arth (EC)

Wu, Cheng-Chih; Lin, Janet Mei-Chuen; Lin, Kai-Yin. (1999). A content analysis of programming examples in high school computer textbooks in Taiwan. *Journal of Computers in Mathematics and Science Teaching*, 18(3), 225-44.

This study examines 16 high school computer textbooks used in Taiwan with an attempt to analyze the nature and the presentation styles of programming examples in them. The authors conclude that the texts lacked a detailed explanation of some of the problem-solving steps.

Matl, Comp (SE)

Yanagimoto, Shigekazu. (1999). Recent developments of primary school teaching materials and methods for Japanese hearing-and speech-impaired students in regular mathematics programs. *FOCUS on Learning Problems in Mathematics*, 21(1), 35-43.

This study presents materials and methods that have been found to be effective in teaching addition and subtraction in specialized schools for the speech- and hearing-impaired.

A/S, LD, Matl (EL)

Yerushalmy, Michal; Gilead, Shoshana. (1999). Structures of constant rate word problems: A functional approach analysis. *Educational Studies in Mathematics*, 39(1-3), 185-203.

This investigation develops and tests a function-based approach to algebra called the Visual Mathematics curriculum in grades 7-9. The authors present a theoretical framework for a systemic investigation of the structures of algebra word problems and their relationship to function-based solutions.

Vis, Alg, Curr, PS (SE)

Yusof, Yudariah BT. Mohammad; Tall, David. (1999). Changing attitudes to university mathematics through problem solving. *Educational Studies in Mathematics*, 37(1), 67-82.

This investigation studies the effects of a course encouraging cooperative problem solving and reflection on thinking activities on students' attitudes. The authors report that a majority declared negative attitudes, but during the problem solving course the changes were almost all in the desired direction.

Att, PS, Grpg (PS)

Journals cited

Australian Primary Mathematics Classroom
Cognition and Instruction
Computers in Human Behavior
Educational Evaluation and Policy Analysis
Educational Research
Educational Studies in Mathematics (26)
European Journal of Engineering Education
FOCUS on Learning Problems in Mathematics (4)
Hiroshima Journal of Mathematics Education (2)
Illinois Mathematics Teacher
International Journal of Computers for Mathematical Learning
International Journal of Mathematical Education in Science and Technology (11)
Journal for Research in Mathematics Education (23)
Journal of Computers in Mathematics and Science Teaching (12)
Journal of Educational Research
Journal of Mathematics Teacher Education (8)
Journal of Research and Development in Education
Journal of Research in Science Teaching
Journal of Science Education and Technology
Journal of the Learning Sciences
Journal of Women and Minorities in Science and Engineering (4)
Learning Disability Quarterly
Mathematical Thinking and Learning (7)
Mathematics and Computer Education
Mathematics Education Research Journal (8)
Mathematics Teacher
Mathematics Teaching in the Middle School
Ohio Journal of School Mathematics (2)
PRIMUS (2)
Review of Educational Research
School Science and Mathematics (14)
Science Educator
Teachers College Record
Teaching Children Mathematics
Teaching Mathematics and Its Applications (2)
Teaching Statistics

Research Papers and Monographs in Mathematics Education Produced in 1999

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This section lists 58 papers and monographs in mathematics education research that were included in the ERIC database in 1999. Each entry is coded (see *Key to Codes*) with one to three major topic codes (in bold type) and any number of minor topic codes, as well as the grade level code (in parentheses). Studies related to preservice or inservice teacher education are indicated by the appropriate codes (Prsv, Insv). The level designated for teacher education or teacher studies indicates the grade level(s) at which the intern or teacher participants teaches, followed by the level code, "T" for teacher or "TE" for teacher education. All entries are indexed by major codes at the end of the volume (see page 73).

Abbott, Lori, & Warfield, Amanda. (1999). *Improving the problem solving skills of math and science students at the high school level.* [SE063246]

This report describes a project for improving problem solving skills in students at the secondary level.

PS, Tchg, Lrng, Att (SE)

Benko, Alice, Loaiza, Rosemary, Long, Robert, Sacharski, Michael, & Winkler, Jennifer. (1999). *Math word problem remediation with elementary students.* [SE062846]

This report describes a program for improving elementary school students' ability to solve mathematical word problems.

D/R, PS, Tchg, Lrng (EL)

Boaler, Jo. (1999). *The community of the mathematics classroom: Situated insights into knowledge development and use.* [SE062556]

This paper continues the analysis of data from three-year case studies of two schools presented in an earlier edition of the JRME (v29, n1), in order to illustrate the use of a particular situated method of interpretation.

Soc, Lrng, Tchg (K-12)

Bowen, Gervase Michael, & Roth, Wolff-Michael. (1999). *"Do-able" questions, covariation and graphical representation: Do we adequately prepare preservice science teachers to teach inquiry?* [SE062401]

This report concludes that traditional schooling emphasizes particular beliefs in the mathematical nature of the universe that make it difficult for many individuals to deal with data possessing the random variation found in measurements of natural phenomena.

Prsv, Tchg, Rep (TE)

Burns, Marilyn. (1999). *Building understanding of multiplication of fractions.* [SE062575]

This paper describes three days of instruction with fifth grade students, and offers a glimpse into actual classroom instruction to provide a platform for discussing mathematical instruction of a traditional skill in a way that focuses on children's thinking and reasoning.

Tchg, M/D, Frac, Lrng (MS)

Chi-chung, Lam; Yun-peng, Ma; Ngai-ying, Wong. (1999). *Teacher Development, Not Accountability Control, Is the Key to Successful Curriculum Implementation: A Case Study of Two Primary Schools in Northeast China.* [ED435591]

Chinese researchers investigated how mathematics teachers in two elementary schools in northeast China adapted the national curriculum. Teacher development was crucial to successful curriculum change.

Insv, Curr (EL)

Durr, Catrina R., Lahart, Therese E., & Maas, Renee M. (1999). *Improving critical thinking skills in secondary math and social studies classes.* [SE062847]

This report describes a program for developing and improving critical thinking skills in adolescents in order to prepare them for life-long learning. Post intervention data indicated an increase in student use of the targeted critical thinking skills as measured by the Cornell Critical Thinking Test - Level X.

PS, Ach (SE)

Fierros, Edward Garcia. (1999). *Examining gender differences in mathematics achievement on the Third International Mathematics and Science Study (TIMSS).* Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Canada, April 19-23, 1999). [SE062534]

The TIMSS report of students in their final year of secondary school found significant gender differences favoring males in mathematics literacy (i.e., application of mathematics to everyday problems), and even greater differences favoring males in advanced mathematics.

Gend, Ach, CC, Assm (HS)

Gibson, Helen L.; Brewer, Lauren K.; Magnier, Jean-Marie; McDonald, James A.; Van Strat, Georgena A. (1999). *The Impact of an Innovative User-Friendly Mathematics Program on Preservice Teachers' Attitudes Toward Mathematics*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23,1999. [ED430930]

This study gathered information about the impact of mathematics courses designed for paraeducators enrolled in an Urban Preservice Degree Articulation in Teacher Education (UPDATE) program. A focus group suggested that the use of manipulatives, hands-on activities, and cooperative learning groups helped UPDATE scholars learn mathematics. The surveys suggested that the mathematics courses improved paraeducators' attitudes toward mathematics.

TAtt, Tchg, Insv (EL)

Gilson, Judith E. (1999). *Single-Gender Education versus Coeducation for Girls: A Study of Mathematics Achievement and Attitudes toward Mathematics of Middle-School Students*. Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23, 1999. [ED430011]

Participants in this study were 467 8th-grade girls from 10 all girls middle schools, 208 girls from 10 independent coeducational middle schools, and 123 11th and 12th grade girls from 2 independent high schools. Overall, large differences were not found for mathematics achievement quantitative ability or attitude for mathematics for eighth-grade girls in single-sex or coeducational schools.

Gend, Ach, Att (SE)

Gomez, Cristina, Steinborsdottir, Olof Bjorg, & Uselmann, Linda. (1999). *Student's understanding of rate of change: The use of different representation*. [SE062595]

This paper focuses on student understanding and learning of the algebraic concept rate of change. Teachers' knowledge about their students and current literature on students' understanding was used to design and assess the instruments presented in this paper.

Alg, Rep, Ach, Curr, TKnw (SE)

Governali, Joanne. (1999). *Sex-Role Biases at the Elementary School Level in Mathematics and the Sciences*. [ED431522]

This study investigated 18 elementary school teachers' awareness of sex-role bias in their classrooms. Teachers' responses to a questionnaire indicated they were largely neutral in their awareness of sex-role bias against female students, particularly in mathematics and science.

Gend, TAtt (EL)

Gregoire, Michele. (1999). *Paradoxes and paradigms in an eighth grade pre-algebra class: A case study of a "Good" math teacher*. [SE062532]

Evidence is presented from an ethnographic study of an eighth grade pre-algebra teacher's classroom in support of the idea that teachers' beliefs about the ontology and epistemology of math profoundly influence how they teach and thus what students learn.

TAtt, TBlf, Phil, Alg (MS, T)

Hanlon, Ellie H., & Schneider, Yasemin. (1999). *Improving math proficiency through self efficacy training*. Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Canada, April 19-23, 1999). [SE062764]

Seventeen pre first year college students participated in a five-week summer program that included whole class instruction, small group tutoring, and individual meetings with instructional coordinators. Over time, students' achievement scores on a math proficiency exam improved significantly, as did their confidence levels about passing this exam.

Att, Ach, Tchg (PS)

Hansen, Laurie E. (1999). *Encouraging parent involvement at home through improved home-school connections*. California: California State University. [SE062582]

This master's project sought to determine the impact which parent-child interaction has on children's literacy, math, and science development before the onset of formal education and during the elementary school years.

Soc, Ach (EC)

Hitt, Fernando, & Santos, Manuel. (1999). *Proceedings of the Annual Meeting of the North American Chapter*

of the International Group for the Psychology of Mathematics Education (21st, Morelos, Mexico, October 23-26, 1999). Volume 2. Columbus, OH: ERIC/CSMEE. [SE062753]

This book contains 10 plenary session reports, 11 working group reports, 24 research reports, 16 short oral reports, 8 poster session reports, and 2 discussion group reports presented at PME-NA 21.

Rsch, Curr, Tchg, Assm, Alg, Stat (K-12)

Hitt, Fernando, & Santos, Manuel. (1999). *Proceedings of the Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education (21st, Morelos, Mexico, October 23-26, 1999). Volume 1.* Columbus, OH: ERIC/CSMEE. [SE062752]

This book contains 10 plenary session reports, 11 working group reports, 24 research reports, 16 short oral reports, 8 poster session reports, and 2 discussion group reports presented at PME-NA 21.

Rsch, Curr, Tchg, Assm, Alg, Stat (K-12)

Huinker, DeAnn; Coan, Cheryl; Posnanski, Tracy. (1999). *Voices of Reform: Infusion of Standards-Based Mathematics and Science Teaching in an Urban District.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23,1999. [ED435771]

This study examined the impact of the Milwaukee Urban Systemic Initiative, a systemic reform initiative, to implement standards-based mathematics and science teaching and learning in one urban school district, noting its effect on teachers, principals, students, and classroom practice. Teachers wanted more collaboration time, stronger leadership, and continuation of the MUSI.

Insv, TAtt, Tchg (K-12)

Joannon-Bellows, Felicia J. (1999). *The relationship between high school mathematics teachers' leadership behavior and students' mathematics anxiety.* [SE062689]

Data gathered from 13 mathematics teachers, and 445 high school mathematics students from two suburban high schools found that students did not perceive their teachers to be credible leaders in the classroom and that higher levels of mathematics anxiety in students were found to be significantly related to two teacher leadership behaviors.

Att, Anx, Att, Gend (SE)

Johnson, Todd M. (1999). *A teacher's roles and calculator tasks in two twelfth-grade mathematics courses.* [SE062850]

The purpose of this study was to investigate the meanings that a teacher associated with calculators as reflected in the teacher's use of calculators in two 12th-grade mathematics courses, and to link those meanings to the institutions and individuals that supported the development of those meanings.

Cltr, Tchg, Calc (SE)

Kahle, Jane Butler, & Kelly, Mary Kay. (1999). *Pathways to systemic reform: Case studies of Ohio schools.* [SE062957]

This document presents five case studies of Ohio schools in order to discuss ongoing systemic reform in Ohio.

Curr, Tchg, Lrng (K-12)

Kennedy, Mary M. (1999). *Form and substance in mathematics and science professional development.* Madison, WI: National Institute for Science Education, University of Wisconsin-Madison. [SE062976]

This document reviews studies of professional development to examine benefits to students in science and mathematics education. A major finding from this review was that program content--what is being taught such as classroom management strategies or knowledge of how students learn specific school subject matter--is an important predictor of later benefits to students.

Insv, Revw (TE)

Klein, Alice; Starkey, Prentice; Wakeley, Ann. (1999). *Enhancing Pre-Kindergarten Children's Readiness for School Mathematics.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23, 1999. [ED431556]

This study evaluated preschool children (n=41) involved in a curriculum grounded in reserach on early mathematical cognition and a control group (n=42). By the end of the year, the mathematical knowledge of children in the intervention group had developed significantly, and was more extensive than the knowledge of children in the comparison group.

Curr, Grpg (EC)

Klein, Stephen, Hamilton, Laura, McCaffrey, Daniel, Stecher, Brian, Robyn, Abby, & Burroughs, Delia. (1999). *Teaching practices and student achievement:*

Report of first-year findings from the "Mosaic" study of systemic initiatives in mathematics and science. [SE062700]

In 1996, NSF provided funds to RAND to investigate the relationships between student achievement in mathematics and science and the use of instructional practices that are consistent with reform. In this report, results from the first year of the study are presented.

Tchg, Ach, Assm (K-12, TE)

Kupermintz, Haggai; Le, Vi-Nhuan; Snow, Richard E. (1999). *Construct Validation of Mathematics Achievement: Evidence from Interview Procedures.* Los Angeles, CA: National Center for Research on Evaluation, Standards, and Student Testing. [ED428125]

An investigation of the validity of measures derived from a large-scale multiple choice achievement test in mathematics, using evidence from introspective think-aloud protocols of students as they attempted test items, provides further evidence that test scores may mask important achievement information.

Ach (HS)

Leonard, Jacqueline. (1999). *From Passivity to Proactivity: A White Female's Development of Participation and Attitude in Middle School Mathematics.* Paper presented at the 20th Annual Meeting of the Ethnography in Education Research Forum, Philadelphia, PA, March 6, 1999. [ED440950]

This paper reports on the interaction patterns of (n=12) sixth grade students who participated in a teacher research study on mathematical discourse, presenting data on teacher-student and student-student interaction patterns.

Cltn, Comm (MS)

Lubienski, Sarah Theule. (1999). *What's hot? What's not? A survey of mathematics education research 1982-1998.* [SE062546]

This study provides a broad look at mathematics education research published since 1982. The Educational Resources Information Center (ERIC) database was utilized to count and categorize over 3,000 articles from 48 educational research journals, with particular attention to equity issues.

Revw, Ethn, Gend (ALL)

Ludlow, Larry H. (1999). *Student drawings as course evaluations: What they see in statistics.* [SE062535]

This paper presents students' drawings of a classroom experience in a statistics course. The drawings offer proof of ways in which teaching practice was effective and also provide an opportunity to understand how students perceived their peers.

Stat (PS)

Madden, Nancy A., Slavin, Robert E., & Simons, Kathleen. (1999). *MATHWINGS: Effects on student mathematics performance. report No. 39.* Baltimore, MD: CRESPAR, Johns Hopkins University, Center for Social Organization of Schools. [SE062699]

Schools involved in Math Wings, a program based on the NCTM Standards, were found to have substantial gains in the Texas Assessment of Academic Skills.

Tchg, Ach, Curr (K-12)

McGinnis, J. R., Parker, Carolyn, & Roth-McDuffie, Amy. (1999). *An investigation in preparing teacher candidates to make connections between science and mathematics.* Arlington, VA: National Science Foundation. [SE062393]

This article presents a detailed description and an interpretation of efforts made to prepare prospective upper elementary/middle level prospective teachers to make connections between science and mathematics.

Prsv, IC, Lrng (TE, MS, EL)

Mitchell, Julia H., Hawkins, Evelyn F., Jakwerth, Pamela M., Stancavage, Frances B., & Dossey, John A. (1999). *Student work and teacher practices in mathematics.* Washington, DC: Education Publications Center (ED Pubs), U.S. Department of Education. [SE063229]

The current report presents examples of student work in five different content strands of mathematics and three types of information derived from the NAEP 1996 mathematics assessment. Information on current instruction in mathematics classes, as reported by students and teachers, is also included.

Ach, Att, Tchg, Lrng, Stat, Geom (K-12)

Mitchell, Julia H., Hawkins, Evelyn F., Stancavage, Frances B., & Dossey, John A. (1999). *Estimation skills, mathematics-in-context, and advanced skills in mathematics: Results from three studies of the national assessment of educational progress 1996 mathematics assessment.* Washington, DC: Education Publications Center (Ed Pubs), U.S. Dept. of Education. [SE063000]

This report presents information from three special studies conducted as part of NAEP 1996 mathematics

assessment. The three studies reported here were designed to provide detail on how students perform on particular types of mathematics questions.

Ach, PS, Est, Lrng (K-12)

Moldavan, Carla, & Walker, Hannah. (1999). *Survey of 1987-1998 Berry college mathematics education graduates.* [SE062553]

This paper reports an indicator of how specific college graduates remain in the teaching profession. A questionnaire mailed to 39 alumni who had received degrees enabling them to be certified to teach secondary mathematics was utilized.

Tchr (T)

Molyneux-Hodgson, Susan. (1999). *Messages from the front and other places: How engineering students are enculturated into mathematics.* [SE062702]

This paper explores the mathematical education of electronic engineering students through an analysis of how mathematics is constituted for the purpose of learning in a university setting.

Curr, Lrng (PS)

Mundry, Susan, & Loucks-Horsley, Susan. (1999). *Designing professional development for science and mathematics teachers: Decision points and dilemmas.* Madison, WI: National Institute for Science Education, University of Wisconsin-Madison. [SE062599]

Four case studies of professional development are synthesized in this report which discusses those decision points or dilemmas common to the cases. A framework for planning and analyzing professional development programs is also presented.

Insv, Plan (TE, SE)

Nelson, Barbara Scott. (1999). *Building new knowledge by thinking: How administrators can learn what they need to know about mathematics education reform.* Newton, MA: Education Development Center. [SE062694]

This paper describes the pedagogical principles that underlie a program designed to provide opportunities for such conceptual change for administrators.

Curr, TAtt (K-12)

Olkun, Sinan, & Knaupp, Jonathan E. (1999). *Children's understanding of rectangular solids made of small cubes.* Paper presented at the Annual Meeting of the Southwest Educational Research Association (San Antonio, TX, January 21-23, 1999). [SE062280]

This study reveals whether the activities of cube configurations cause any improvement in student strategies that lead them to use composite or iterable units.

Geom, Vis, Knw (EC)

Pang, JeongSuk. (1999). *When changes don't make changes: Challenges in implementing reform ideals in elementary mathematics classrooms.* [SE062989]

This study is based on a cross-cultural investigation of how teachers understand the objectives of reform movements and how they characterize reform relative to their own experiences and priorities. Two U.S. second grade classes that are attempting to implement student-centered instructional methods in mathematics are compared and contrasted.

Curr, Tchg, Soc (EC, T)

Porter, Rhonda C. (1999). *Gender differences in mathematics performance.* Paper presented at the Annual Meeting of the Holmes Partnership (Boston, MA, January 27, 1999). [SE062379]

This study entails a gender comparative analysis of students' mathematics performance. Ethnic background, socio-economic status, and expectations and visible role models presented by the teachers were found to affect performance in the students favoring females.

Ach, Ethn, Gend, Soc, TAtt (K-12)

Pourdavood, Roland G.; Cowen, Lynn M.; Svec, Lawrence V. (1999). *Complexity of School Reform: Order and Chaos.* [ED430286]

A case study of the process K-4 teachers encounter as they attempt change showed that initial changes in implementing the standards were mechanical--the lessons and materials did little to change teachers' existing beliefs and practices about mathematics. However, the reform took a different direction when some K-4 teachers "reinvented" mathematics instruction around key ideas and processes within a relevant context for children.

Tchg, Insv (EC, T)

Rust, Amanda L. (1999). *A study of the benefits of math manipulatives versus standard curriculum in the comprehension of mathematical concepts.* [SE062759]

This study attempted to determine which teaching method, mainly manipulatives or the standard curriculum, best allowed the students to learn first grade math concepts.

Manp, Curr (EL)

Ryan, Walter F. (1999). *The effects of using the TI-92 calculator to enhance junior high students' performance in and attitude toward geometry.* [SE062995]

A comparison of the attitude and performance of (n=344) seventh-grade students taught geometry using the TI-92 found significantly higher scores and more positive attitudes than students taught using a traditional approach.

Geom, GCal, Att, Ach, Tchg (MS)

Schwarz, Justine C. (1999). *Vocabulary and its effects on mathematics instruction.* [SE063245]

This report describes a program that enhanced vocabulary development and communication within the content area of mathematics.

Comm, Tchg, Writ, Matl (K-12)

Secada, Walter G., Ortiz-Franco, Luis, Hernandez, Norma G., & De La Cruz, Yolanda. (1999). *Changing the faces of mathematics: Perspectives on Latinos.* Reston, VA: National Council of Teachers of Mathematics. [SE062571]

This book focuses on a number of salient research and practice issues in the teaching and learning of mathematics among the second largest minority group in the United States, Latinos.

Rsch, Ethn (ALL)

Stigler, James W., Gonzales, Patrick, Kwanaka, Takako, Knoll, Steffen, & Serrano, Ana. (1999). *The TIMSS videotape classroom study: Methods and findings from an exploratory research project on eighth-grade mathematics instruction in Germany, Japan, and the United States.* Washington, DC: National Center for Education Statistics. [SE062649]

This report presents the methods and preliminary findings of the Videotape Classroom Study, a video study of eighth-grade mathematics lessons in Germany, Japan, and the United States as a part of the Third International Mathematics and Science Study (TIMSS).

Tchg, Ach, CC, Lrng (MS)

Swank, Anne Laney Greenwood. (1999). *The effect of weekly math homework on fourth grade student math performance.* [SE062758]

This study examined whether or not homework was beneficial in the subject of math, focusing mainly on homework's effects on quiz scores. Lengthy homework assignments that focused on drill and practice seemed to not be effective.

Ach, Tchg (EL)

Tarr, James E., Mittag, Kathleen C., Uekawa, Kazuaki, & Lennex, Lesia. (1999). *A comparison of calculator use in eighth-grade mathematics classrooms in the United States, Japan, and Portugal: Results from the Third International Mathematics and Science Study.* Paper presented at the Annual Meeting of the American Educational Research Association (Montreal, Canada, April 19-23, 1999). [SE062552]

This study used data from the Third International Mathematics and Science Study (TIMSS) to determine trends in calculator use among 13-year-old students in Japan, the United States, and Portugal.

Cltr, CC, Tchg (MS)

Thomas, John P. (1999). *Influences on mathematics learning among African American high school students.* [SE062592]

The major purpose of this study was to determine if the influences of educational productivity factors on achievement and attitudes are the same for African Americans and other ethnic groups.

Ethn, Att, Ach, Lrng (HS, PS)

Truran, John M., & Truran, Kathleen M. (1999). *Making the difference: Proceedings of the Annual Conference of the Mathematics Education Research Group of Australasia Incorporated (22nd, Adelaide, South Australia, July 4-7, 1999).* Australia: MERGA, c/o Jon Ladbrooke. [SE062776]

This document contains the proceedings of the 22nd Annual Conference of the Mathematics Education Research Group of Australia Incorporated, held in Adelaide, South Australia, July 4-7, 1999.

Rsch, Tchg, PS, Assm, Tech (K-12)

Wang, Sea-Yu Patrick, Guo, Chorng-Jee, Chiang, Wu-Hsiung, & Cheng, Shiu-Shan. (1999). *Teaching for meaningful understanding: A school-based science and mathematics teacher development project.* Paper presented at the Annual Meeting of the National Association of Research in Science Teaching (Boston, MA, March 29, 1999). [SE062392]

The purpose of this study is to establish a model for school-based teacher development for secondary science and mathematics teachers in Taiwan.

Insv, Tchg, TAtt (TE, SE)

Webster, Beverley J., Young, Deidra J., & Fisher, Darrell L. (1999). *Gender and socioeconomic equity in mathematics and science education: A comparative study.* [SE062533]

The purpose of this study was to use secondary analysis of the TIMSS database to examine the differences in a students' opportunity to learn mathematics and science and the differences in classroom teaching practices and delivery of the curriculum and to investigate those variables associated with gender and socioeconomic equity in a students' mathematics and science achievement.

Ach, Gend, Soc, Tchg (K-12)

Winter, Jan. (1999). *Issues in National Assessment of Mathematics--the Transition to Higher Level Study.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Quebec, Canada, April 19-23, 1999. [ED430038]

This study was conducted in England in 1997 to consider materials that were available to support students making a transition from compulsory education to the study of mathematics in noncompulsory post-16 education.

Matl, Curr (SE, PS)

Wu, Angela. (1999). *The Japanese education system: A case study summary and analysis.* Washington, DC: Office of Educational Research and Improvement. [SE062262]

This study examined the reasons for Japanese students' relative success on TIMSS. The author suggests that the Japanese educational structure helps build student motivation by emphasizing effort over ability, engaging students, building strong classroom relationships, and unifying students under a common goal.

CC, Att, Tchg, Curr (K-12)

Zaslavsky, Orit. (1999). *Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, July 25-30, 1999. Volume 4.* [SE062981]

This conference proceedings contains 135 research reports, 73 short oral reports, 30 poster session reports, 4 plenary addresses, 3 research forums, 6 project groups and 5 discussion group reports.

Rsch, Curr, Prsv, Tchg, Insv, PS (ALL, TE)

Zaslavsky, Orit. (1999). *Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, July 25-30, 1999. Volume 3.* [SE062980]

This conference proceedings contains 135 research reports, 73 short oral reports, 30 poster session reports, 4 plenary addresses, 3 research forums, 6 project groups and 5 discussion group reports.

Rsch, Curr, Prsv, Tchg, Insv, PS (ALL, TE)

Zaslavsky, Orit. (1999). *Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, July 25-30, 1999. Volume 2.* [SE062979]

This conference proceedings contains 135 research reports, 73 short oral reports, 30 poster session reports, 4 plenary addresses, 3 research forums, 6 project groups and 5 discussion group reports.

Rsch, Curr, Prsv, Tchg, Insv, PS (ALL, TE)

Zaslavsky, Orit. (1999). *Proceedings of the 23rd Conference of the International Group for the Psychology of Mathematics Education, Haifa, Israel, July 25-30, 1999. Volume 1.* [SE062978]

This conference proceedings contains 135 research reports, 73 short oral reports, 30 poster session reports, 4 plenary addresses, 3 research forums, 6 project groups and 5 discussion group reports.

Rsch, Curr, Prsv, Tchg, Insv, PS (ALL, TE)

Zhou, Zheng, Cheng, Christine, Mottram, Lisa, & Rosenblum, Stacey. (1999). *Understanding informal and formal mathematical abilities in Mainland Chinese and Chinese-American children.* [SE062544]

Informal and formal mathematical abilities were studied in the preschool, kindergarten, and first grade children in Beijing, China and Chinese-American children in New York City. A parent questionnaire was used to examine parents' attitudes toward their children's learning.

CC, Lrng, Soc (EC)

Index

Every dissertation, journal article, paper, and monograph listed in the preceding three sections is indexed by one to three **Major** and any number of *Minor* topic codes. The 75 major codes have been clustered into 20 groups of related topics for the purpose of indexing. Only the **Major** codes are listed after each entry in the index.

Achievement (Ach)

Dissertations

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Breneman — Alg, Ach
Brown — Assm, Ach
Burchill — Ach, Curr
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Geiser — Att, Styl, Ach
Gilson — Gend, Att, Ach
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Mitchell — Ach, PS, Est
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Affect (Aff); Anxiety (student's) (Anx); Attitudes (student's) (Att); Beliefs (student's) (Blf)

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Bruno — Gend, Att, Anx
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Cohen — Anx, Clln, Curr
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Geiser — Att, Styl, Ach
Gilson — Gend, Att, Ach
Gjertsen — Ach, Att, Gend
Goudelock — Att, Comp, PS
Hall — Att, Blf, Ethn
Hawkins — Att, Ach, Aff
Hendricks — Blf, PS, Stat
Herbst — Knw, Blf, TBlf
Hogan — Att, Curr, Soc
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Kelley — Blf, Calc, Knw
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Loud — Writ, Att, Blf
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Martin — Ethn, Att, Curr
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Slavit	Tech, Calc
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Fairman	Curr, Lrng, TBlf
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Gutierrez	Prsv, Geom, TKnw
Halpin	TAtt, Comp, IC
Langford	Prsv, TAtt, TBlf
Li	Revw, TBlf, Gend
Lloyd	Grpg, Curr, TBlf
Mewborn	Prsv, Grpg, TKnw
Middleton	TAtt, Curr, TBlf

Milou	GCal, TAtt
Mingus	Prf, TAtt, TBlf
Nicol	Prsv, TKnw, Tchr
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Pehkonen	Att, TBlf
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Silver	Writ, Tchr
Simon	Insv, TKnw, Tchg
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Governali	Gend, TAtt
Gregoire	TAtt, TBlf, Phil
Gregoire	TAtt, TBlf, Phil
Huinker	Insv, TAtt, Tchg
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Johnson	Frac, NSns, Mscn
Johnson	Manp, Writ, PlcV
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Murphy	Curr, A/S, Anx
Nisbett	Arth, PlcV, Soc
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Shull	NSns
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Bruno	A/S, NSns
Cosgrave	Gift, NSns, Oral
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Gfeller	PS, Rep, Arth
Hahn	RaPc, Soc
Kamii	Arth, Rep
Linchevski	NSns, Rep, Tchg
Morris	NSns, Alg, Arth
Olive	NSns, Comp, Frac
Reys	NSns, CC, Tchg
Slavit	Alg, Arth
Tzur	Frac, PS, Comp
Verschaffel	PS, A/S, Rep
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Carriveau	Assm
Harpster	Assm, Insv, TKnw
Hernandez	Assm, TKnw, Prsv
Hofstetter	Assm, Ethn
Huang	Gift, Assm
Kelly	Assm, Rsch, Comm
Klassen	Assm
Letshabo	Gend, Assm, Lrnr
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Ryan	Assm, Tchg, Curr
Savelli-Keska	Gend, Assm, Tchg
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Cole	Clln, Assm
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Calculators (Calc); Computer-assisted instruction (CAI); Computers (general) (Comp); Graphing calculators (GCal); Microcomputer, microcalculator based labs (M/Cbl); Multimedia (MMed); Technology (general) (Tech)

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Axtell Dean	Manp, Prsv, Tech
Bedell	CAI
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Berryman	Tech
Cates	Alg, GCal
Donald	GCal, Insv, Comp
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Goudelock	Att, Comp, PS
Hernandez	Alg, CAI, Tchg
Jones	Att, CAI, Lrng
Kuchler	CAI, Re[illegible]
Lachance	Insv, TKnw, Tech
Larew	CAI, Geom, Tchg
Macleod	Gend, Grpg, Comp
Marinas	PS, CAI, Styl
Merckling	GCal, Styl, Ach
Miller	CAI, Styl
Miller	Att, Tech, Alg
Naylor	Lrng, CAI, PS
Noguera	Alg, GCal, Att
Perez	CAI, Ethn
Petropoulos	Oral, Tech, Soc
Pianfetti	Tech, Rep
Portafoglio	CAI, Gend, Grpg
Quigley	Comp, Ethn, Ach
Runde	Alg, CAI, PS
Souders	Tech, IC, Ach
Steig	Tech, Curr, Lrnr
Thurman	Tech, Comm, Soc
Tiwari	Calc, CAI, M/CBL
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Vancleave	GCal, TBlf, Lrng
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Cleland	MMed, Insv, Plan
Croy	Comp, Prf, Vis
Forster	Lrng, Tech, Grpg
Halpin	TAtt, Comp, IC
Harrison	Tech, Curr, Comm
Healy	Lrnr, Vis, Comp
Heid	Rsch, Tech, Tchg
Hollar	Alg, GCal
Jervis	Tech, Comp, Tchg
Kalchman	Comp, Gift, Alg
Lang	CAI, Soc, Calc
Lindsay	Alg, Comp, Styl
Manoucherhri	CAI, Tchg
Meel	Writ, Calc, Tech
Merriweather	GCal, Styl, Att
Milou	GCal, TAtt
Molyneux-Hodgson	Comp, Rep, Soc
Olive	NSns, Comp, Frac
Palis	Comp, Tchr
Roberts	Comp, Geom
Schmidt	TBlf, Cltr
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Grouping for instruction, cooperative learning (Grpg); Planning, decision making (Plan); Teaching (role, style, methods) (Tchg)

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Botta	Stat, Tchg
Brendefur	Tblf, Tknw, Tchg
Buerman	Grpg, Gend, Ethn
Chao	Tchg, Geom, Curr
Charles	Lrng, Tchg
Clement	Tchg, TBlf
Davis	Ethn, Grpg, Tchg
Eaton	Ethn, Tchg
Elshafei	Grpg, Lrng, Tchg
Flores	Curr, Insv, Tchg
Forbes	Ach, Grpg
Green	Grpg, Alg
Hernandez	Alg, CAI, Tchg
Hurley	Curr, Int, Tchg
Jacobs	CC, TBlf, Tchg
Johar	Att, Knw, Tchg
Johnson	Prsv, Tchg, Styl
Kayona	Ach, Insv, Tchg
Kehle	PS, Rep, Tchg
Kelley	Att, PS, Tchg
Larew	CAI, Geom, Tchg
Li	Oral, Tchg
Little	Grpg, Soc, Att
Lomax	TKnw, Tchg, Insv
Macleod	Gend, Grpg, Comp
Mainzer	LD, Grpg
Malouf	Ach, Att, Tchg
Melita	Prf, Tchg, Matl
Merz	Tchg, Writ
Mooney	Stat, Plan
Nelson	Curr, Oral, Tchg
Nigam	Calc, Vis, Tchg
Pezeshki	Ethn, Alg, Tchg
Portafoglio	CAI, Gend, Grpg
Pruitt	Curr, Tchg
Riley	Tchg, Matl
Rothe	Plan, Tblf
Roulet	TBlf, Tchg, TAtt
Ryan	Grpg, Tchg
Ryan	Assm, Tchg, Curr
Sanders	CC, Tchg, Ach
Savelli-Keska	Gend, Assm, Tchg
Suyanto	Grpg, Ach
Towers	Tchg
Truitt	Curr, TBlf, Tchg
Trujillo	Assm, Att, Grpg
Walker	Tchg, Lrng, PS
Wang	Prsv, Tchg, Lrng
Whicker	Grpg, Comm
Williams	Insv, Tchg, TAtt

Articles

Adedayo	Tchg, Grpg, Gend
Artzt	Plan, Tchg
Artzt	Prsv, TKnw, Tchg
Barzilai	Calc, Grpg, Curr
Bischoff	Prsv, Tchg, IC
Bussi	PS, Tchg, Clln
Chroge	PS, Tchg
Cleland	MMed, Insv, Plan
Edwards	Rsch, Tchg
Forster	Lrng, Tech, Grpg
Gellert	TKnw, Tchg, TBlf
Graham	CC, Tchg, Soc
Haimes	Tchg, Eqty
Heid	Rsch, Tech, Tchg
Jervis	Tech, Comp, Tchg
LaBerge	Tchg
Linchevski	NSns, Rep, Tchg
Lloyd	Grpg, Curr, TBlf
Loucks-Horsley	Insv, Soc, Tchg
Luft	Curr, Plan, Prsv
Manoucherhri	CAI, Tchg
Mewborn	Prsv, Grpg, TKnw
Miller	IC, Tchg
Pourdavood	TAtt, Tchg, Prsv
Reys	NSns, CC, Tchg
Simon	Insv, TKnw, Tchg
Spillane	Tchg
Springer	Grpg, Att
Verschaffel	PS, Tchg
Walen	PS, Clln, Grpg
Yusof	Att, PS, Grpg

Papers

Abbott	PS, Tchg
Bowen	Prsv, Tchg, Rep
Burns	Tchg, M/D, Frac
Gibson	TAtt, Tchg, Insv
Hitt	Rsch, Curr, Tchg
Huinker	Insv, TAtt, Tchg
Johnson	Cltr, Tchg
Klein	Curr, Grpg
Klein	Tchg, Ach
Madden	Tchg, Ach
Mitchell	Ach, Att, Tchg
Mundry	Insv, Plan
Pang	Curr, Tchg
Pourdavood	Tchg, Insv
Schwarz	Comm, Tchg, Writ
Stigler	Tchg, Ach, CC
Swank	Ach, Tchg
Truran	Rsch, Tchg
Wang	Insv, Tchg
Wu	CC, Att, Tchg

Classroom interaction (CIIn); Communications (Comm); Oral communication, classroom discourse (Oral); Writing, journals (Writ)

Dissertations

Anderson	CAI, Comm
Bellisio	Alg, Comm, PS
Burkett	Writ, Lrng
Canfield	Comm, Rep
Cipoletti	Tatt, Gend, CIIn
Cohen	Anx, CIIn, Curr
Crumbaugh	Lrng, Oral, CIIn
Dupree	Att, CIIn, Lrng
Goss	Writ
Han	Ethn, Lang, Comm
Johnson	Manp, Writ, PlcV
Kelly	Assm, Rsch, Comm
Larriva	Lrng, Gend, Comm
Li	Oral, Tchg
Loud	Writ, Att, Blf
Mendez	Comm, Oral
Merz	Tchg, Writ
Mitchell	Writ, Lrng
Nelson	Curr, Oral, Tchg
Petropoulos	Oral, Tech, Soc
Price	CIIn, Lrng, Knw
Sample	Writ, Ach, Att
Stack	TKnw, Geom, Writ
Strickland	Calc, CIIn, Curr
Thurman	Tech, Comm, Soc
Wahlberg	Calc, Writ
Whicker	Grpg, Comm

Articles

Adler	Comm, Oral, Ethn
Boaler	Knw, Comm, Rsch
Bolte	Writ, TKnw
Bowers	PlcV, Comm, Soc
Bussi	PS, Tchg, CIIn
Cobb	Oral, Soc, PS
Cole	CIIn, Assm
Cosgrave	Gift, NSns, Oral
Douek	CIIn, Geom, Rep
Harrison	Tech, Curr, Comm
Inagaki	Oral, CC, Prf
Kawanaka	Oral, CC
Meel	Writ, Calc, Tech
Silver	Writ, Tchr
Walen	PS, CIIn, Grpg
Wood	CIIn, Oral

Papers

Leonard	CIIn, Comm
Schwarz	Comm, Tchg, Writ

Cross-cultural (CC); Equity (Eqty); Ethnic, racial (Ethn); Social factors, context, parents (Soc)

Dissertations

Algaze	Ach, Curr, Ethn
Bang	Lrng, Eqty
Bourquin	Anx, Gend, Soc
Brown-Kovacic	Assm, Gend, Ethn
Buerman	Grpg, Gend, Ethn
Celedon	Ethn, Lang, PS
Cran	D/R, Ethn, Gend
Davis	Ethn, Grpg, Tchg
Denson	Alg, Gend, Ethn
Eaton	Ethn, Tchg
Edmonds	Soc, Alg
Enyart	Insv, Soc
Hall	Att, Blf, Ethn
Han	Ethn, Lang, Comm
Hill	Ethn, Soc, Tatt
Hofstetter	Assm, Ethn
Hogan	Att, Curr, Soc
Jacobs	CC, TBlf, Tchg
Jean	Ethn, PS
Kaminski	Ach, Ethn, Soc
Krenicki	Ach, Soc
Little	Grpg, Soc, Att
Long	Gift, CC
Lopez	Ethn, CC, Soc
Martin	Ethn, Att, Curr
Mceneaney	Soc, Matl
Miranda	Blf, Soc
Nisbett	Arth, PlcV, Soc
O'leary	Ethn, Impl
Oquendo-Rodriguez	Ethn, Gend
Perez	CAI, Ethn
Petropoulos	Oral, Tech, Soc
Pezeshki	Ethn, Alg, Tchg
Phillips-Bey	Ethn, Soc
Posey	Ethn, Ach, Soc
Quigley	Comp, Ethn, Ach
Reiter	Att, Soc, PS
Rosa	PS, CC, Ethn
Samuels	Ethn, Matl
Sanders	CC, Tchg, Ach
Schiff	Ethn, Ach, Att
Selman	Soc, Aff
Shawal	Vis, CC, PS
Shockey	IC, Soc
Stemn	Ethn, Att, Blf
Thorndike-Christ	Soc, Blf
Thurman	Tech, Comm, Soc
Trlica	Ach, Curr, Ethn
Ullah	Eqty, Gend, Soc
Williamson	Ethn, PS, CC
Zankofski	Gend, Ethn, Soc

Articles

Aberg-Bengtsson	Gend, CC, Ach
Adler	Comm, Oral, Ethn
Bowers	PlcV, Comm, Soc
Brenner	CC, Rep
Cobb	Oral, Soc, PS
Graham	CC, Tchg, Soc
Hahn	RaPc, Soc
Haimes	Tchg, Eqty
Inagaki	Oral, CC, Prf
Kawanaka	Oral, CC
Kimmel	Insv, Eqty, LD
Lang	CAI, Soc, Calc
Loucks-Horsley	Insv, Soc, Tchg
Ma	Ach, Soc
McShea	Ach, Ethn, Curr
Molyneux-Hodgson	Comp, Rep, Soc
Moreno	Eqty, Calc, Gend
Nunez	Lrng, Soc, Ethn
O'Brien	Blf, Gend, Ethn
Reys	NSns, CC, Tchg
Sharpe	Gend, Eqty
Sons	Blf, Soc
Wedege	Soc, Att, Pers

Papers

Boaler	Soc, Lrng
Fierros	Gend, Ach, CC
Hansen	Soc, Ach
Porter	Ach, Ethn, Gend
Secada	Rsch, Ethn
Stigler	Tchg, Ach, CC
Tarr	Curr, CC
Thomas	Ethn, Att, Ach
Webster	Ach, Gend, Soc
Wu	CC, Att, Tchg
Zhou	CC, Lrng, Soc

Curriculum, programs (Curr); Diagnosis, remedial mathematics (D/R); Integrated curriculum (IC); Manipulatives (Manp); Materials (texts, other resources) (Matl)

Dissertations

Adams	Curr, IC
Adamy	Tech, IC, Tknw
Algaze	Ach, Curr, Ethn
Axtell Dean	Manp, Prsv, Tech
Bird	Ach, Assm, Curr
Blackburn	Insv, Plan, Curr
Blasquez	Curr, TBlf, Lrng
Boone	Lrng, Curr, Styl
Bryant	D/R
Burchill	Ach, Curr
Carter	Curr, Lrng
Chao	Tchg, Geom, Curr
Cohen	Anx, Clln, Curr
Collins	Curr, Prsv
Cran	D/R, Ethn, Gend
Fairman	Curr, Lrng, TBlf
Flores	Curr, Insv, Tchg
Flowers	Curr, RaPc, PS
Fox	Ach, Alg, Curr
Geoghegan	Curr, Lrng
Gormas	Curr
Graham	Curr, TKnw, TBlf
Gross	Tatt, D/R
Haas	Manp, Frac
Handley	Curr, Lrng
Hogan	Att, Curr, Soc
Hurley	Curr, Int, Tchg
Isley	Alg, Curr, Ach
Johnson	Manp, Writ, PlcV
Kennedy	Att, Curr, TAtt
Kim	Curr, Lrng, Patt
Krebs	Alg, Curr, Patt
Laudien	Matl, Curr, Prf
Martin	Ethn, Att, Curr
Matthews	Curr, Calc
Mceneaney	Soc, Matl
Melita	Prf, Tchg, Matl
Mitchell	TAtt, Tchr, Curr
Moyer	Manp, Tchr, Att
Murdock	Curr, Prsv
Murphy	Curr, A/S, Anx
Nelson	Curr, Oral, Tchg
Omniewski	Manp, IC, Curr
Patterson	Curr
Pruitt	Curr, Tchg
Raban	Curr, Prsv
Ridlon	Att, Curr, Lrng
Riley	Tchg, Matl
Ruppert	Curr, Knw
Ryan	Assm, Tchg, Curr
Samuels	Ethn, Matl
Schleyer	Curr, TAtt, IC
Shockey	IC, Soc
Smith	Curr, Tknw, Insv
Smith	Att, Blf, D/R
Souders	Tech, IC, Ach
Stannard	Ach, Patt, Manp
Steig	Tech, Curr, Lrnr
Stevens	IC, Patt, Knw
Strickland	Calc, Clln, Curr
Trlica	Ach, Curr, Ethn
Truitt	Curr, TBlf, Tchg
Welch	Matl, IC, Alg
Wisniewski	IC, Calc
Wright	Curr, Alg
Yee	Curr, Lrng, Assm

Articles

Ainsa	Comp, Manp, PS
Armstrong	Calc, Curr
Barzilai	Calc, Grpg, Curr
Battista	PS, Geom, Manp
Bischoff	Prsv, Tchg, IC
Chaney-Cullen	Curr, Tech, MMed
Chassapis	Geom, Matl, Meas
Gearhart	Frac, Curr
Halpin	TAtt, Comp, IC
Harrison	Tech, Curr, Comm
Holton	PS, Curr
Lloyd	Grpg, Curr, TBlf
Luft	Curr, Plan, Prsv
Maccini	Alg, D/R, LD
McShea	Ach, Ethn, Curr
Middleton	TAtt, Curr, TBlf
Miller	IC, Tchg
Noss	Curr, Phil
Papick	Prsv, Curr
Wu	Matl, Comp
Yanagimoto	A/S, LD, Matl
Yerushalmy	Vis, Alg, Curr

Papers

Benko	D/R, PS
Chi-chung	Insv, Curr
Hitt	Rsch, Curr, Tchg
Kahle	Curr
Klein	Curr, Grpg
McGinnis	Prsv, IC
Molyneux-Hodgson	Curr
Nelson	Curr, TAtt
Pang	Curr, Tchg
Rust	Manp, Curr
Winter	Matl, Curr
Zaslavsky	Rsch, Curr, Prsv

Discrete mathematics (DscM); Probability (Prob); Statistics (Stat)

Dissertations

Biske	Gend, Prob, Stat
Botta	Stat, Tchg
Carbone	Insv, Stat
Chi	Anx, Stat
Creech	TKnw, Stat
Havill	Prob, PS
Hendricks	Blf, PS, Stat
Long	Stat, Prob
Mooney	Stat, Plan
Ritson	Prob, Lrng
Robinson	Stat, Assm
Vahey	Prob, PS, CAI

Articles

Batanero	Prob, Stat, Lrng
Fast	Prob, PS
Jones	Prob, Styl
Putt	Vis, Stat
Roberts	Stat, Assm
Watson	Stat, Rep

Paper

Ludlow	Stat

Gender differences (Gend)

Dissertations

Biske	Gend, Prob, Stat
Bourquin	Anx, Gend, Soc
Brown-Kovacic	Assm, Gend, Ethn
Bruno	Gend, Att, Anx
Buerman	Grpg, Gend, Ethn
Cipoletti	Tatt, Gend, Clln
Cran	D/R, Ethn, Gend
Denson	Alg, Gend, Ethn
Dickerson	Gend, PS, Styl
Dorner	Ach, Gend, Rsch

Ely Gend, Att, Aff
Fleming Gend, Att, Anx
Gilson Gend, Att, Ach
Gjertsen Ach, Att, Gend
Larriva Lrng, Gend, Comm
Letshabo Gend, Assm, Lrnr
Looman Aff, Gend, Blf
Macleod Gend, Grpg, Comp
Nettles Gend, Aff
Oquendo-Rodriguez Ethn, Gend
Portafoglio CAI, Gend, Grpg
Rhodes Alg, Att, Gend
Savelli-Keska Gend, Assm, Tchg
Schlosberg Gend, Att, Blf
Smith Gend, Styl, Att
Tinkler Assm, Gend, PS
Ullah Eqty, Gend, Soc
White Gend, Att, Ach
White-Lucas Gend, Att, Ach
Zankofski Gend, Ethn, Soc

Articles

Aberg-Bengtsson Gend, CC, Ach
Adedayo Tchg, Grpg, Gend
Carr Gend, Lrnr, Styl
Chouinard Anx, Gend, Att
Forgasz Gend, Att, Rsch
Li Revw, TBlf, Gend
Moreno Eqty, Calc, Gend
O'Brien Blf, Gend, Ethn
Royster Att, Gend, Blf
Sharpe Gend, Eqty
Sherman Tech, PS, Gend

Papers

Fierros Gend, Ach, CC
Gilson Gend, Ach, Att
Governali Gend, TAtt
Porter Ach, Ethn, Gend
Webster Ach, Gend, Soc

Geometry (Geom); Measurement (Meas); Spatial visualization (Vis)

Dissertations

Baynes Geom, Ach, Lrng
Camp Geom
Chao Tchg, Geom, Curr
Drottar GCal, Vis
Gerretson Geom, Tech, Prsv
Idris Geom
Larew CAI, Geom, Tchg
Matos Geom, Rep, Lrng
Nigam Calc, Vis, Tchg
Shawal Vis, CC, PS
Stack TKnw, Geom, Writ
Stephan Meas, Lrng

Articles

Battista PS, Geom, Manp
Chassapis Geom, Matl, Meas
Clements Meas, Revw
Clements Rep, Geom
Croy Comp, Prf, Vis
Douek CIIn, Geom, Rep
Gutierrez Prsv, Geom, TKnw
Healy Lrnr, Vis, Comp
Houdement Geom, Rsch
Kieran Alg, Vis, Rep
Putt Vis, Stat
Roberts Comp, Geom
Stump Alg, TKnw, Geom
Yerushalmy Vis, Alg, Curr

Papers

Olkun Geom, Vis
Ryan Geom, GCal, Att

Gifted (students) (Gift); Knowledge (student's) (Knw); Learners (characteristics of) (Lrnr); Learning disabled (LD); Learning style, cognitive style (Styl); Misconceptions (Mscn)

Dissertations

Adams Gift, Lrnr
Alfred Lrng, PS, Styl
Arvedson NSns, Lang, LD
Boone Lrng, Curr, Styl
Dickerson Gend, PS, Styl
Dunn Prsv, Tatt, LD
Geiser Att, Styl, Ach
Hauger Calc, Knw
Herbst Knw, Blf, TBlf
Hogan-Gancarz LD
Huang Gift, Assm
Izsak Alg, Knw, Rep
Johar Att, Knw, Tchg
Johnson Prsv, Tchg, Styl
Johnson Frac, NSns, Mscn
Kelley Blf, Calc, Knw
Letshabo Gend, Assm, Lrnr
Long Gift, CC
Long Gift
Mainzer LD, Grpg
Marinas PS, CAI, Styl
Mcgivney-Burelle PS, Knw, Mtcg
Merckling GCal, Styl, Ach
Miller CAI, Styl
Orazio Styl, Att, Ach
Pinzka Calc, Mscn, Rep
Price CIIn, Lrng, Knw
Ruppert Curr, Knw
Serafino Knw, PS
Singh Eqv, RaPc, Knw
Sliva TAtt, LD
Smith Gend, Styl, Att
Steig Tech, Curr, Lrnr
Stevens IC, Patt, Knw
Strychasz Gift, Impl, Att
Tokar Gift
Weinstein Lrng, Knw, Att
White CAI, Att, Styl
Zhu Knw, Lrng, Rsch

Articles

Armstrong Att, Lrnr
Boaler Knw, Comm, Rsch
Carlson PS, Lrng, Knw
Carr Gend, Lrnr, Styl
Cosgrave Gift, NSns, Oral
Estepa Styl, Mscn
Fischbein Mscn, NSns, Lrng
Hazzan Alg, PS, Lrnr
Healy Lrnr, Vis, Comp
Jones Prob, Styl
Kalchman Comp, Gift, Alg
Kimmel Insv, Eqty, LD
Lindsay Alg, Comp, Styl
Maccini Alg, D/R, LD
Merriweather GCal, Styl, Att
Mingus Gift, Lrnr
Steele LD, Comp, PS
Tirosh Mscn, PS
Tsamir PS, Knw, Rep
Vacc TBlf, Lrnr
Wedege Soc, Att, Pers
Yanagimoto A/S, LD, Matl

Implications of research, interpretations of research (Impl); Research issues, methods (Rsch); Reviews of research (Revw)

Dissertations

Dorner	Ach, Gend, Rsch
Kelly	Assm, Rsch, Comm
Kuchler	CAI, Revw
O'leary	Ethn, Impl
Strychasz	Gift, Impl, Att
Zhu	Knw, Lrng, Rsch

Articles

Boaler	Knw, Comm, Rsch
Clements	Meas, Revw
Donoghue	Rsch
Edwards	Rsch, Tchg
Forgasz	Gend, Att, Rsch
Heid	Rsch, Tech, Tchg
Hiebert	Impl, Rsch, Revw
Houdement	Geom, Rsch
Li	Revw, TBlf, Gend
Ma	Revw, Ach, Anx
Middleton	Ach, Att, Revw
Tobias	Revw, Prsv

Papers

Hitt	Rsch, Curr, Tchg
Kennedy	Insv, Revw
Lubienski	Revw
Secada	Rsch, Ethn
Truran	Rsch, Tchg
Zaslavsky	Rsch, Curr, Prsv

Inservice teacher education, professional development (Insv); Preservice teacher education (Prsv)

Dissertations

Axtell Dean	Manp, Prsv, Tech
Blackburn	Insv, Plan, Curr
Bucci	Phil, Prsv
Campbell	Prsv, Lrng, TKnw
Carbone	Insv, Stat
Cha	Prsv, Tknw, TBlf
Collins	Curr, Prsv
Donald	GCal, Insv, Comp
Dunn	Prsv, Tatt, LD
Enyart	Insv, Soc
Fan	TKnw, Insv
Flores	Curr, Insv, Tchg
Gerretson	Geom, Tech, Prsv
Gregg	TAtt, TKnw, Prsv
Grunow	TKnw, Insv, Frac
Hannigan	Prsv, PlcV
Harpster	Assm, Insv, TKnw
Hernandez	Assm, TKnw, Prsv
Johnson	Prsv, Tchg, Styl
Johnson	Insv, Tknw
Kayona	Ach, Insv, Tchg
Lachance	Insv, TKnw, Tech
Lomax	TKnw, Tchg, Insv
Murdock	Curr, Prsv
Nussbaum	Prsv, TBlf
Osterhus	Insv, TBlf, Tchr
Raban	Curr, Prsv
Smith	Curr, Tknw, Insv
Timmerman	Insv, TBlf, TKnw
Wang	Prsv, Tchg, Lrng
Watters	Prsv, TKnw
Weir	Insv, TKnw, Lrng
Williams	Insv, Tchg, TAtt

Articles

Artzt	Prsv, TKnw, Tchg
Bischoff	Prsv, Tchg, IC
Cleland	MMed, Insv, Plan
Gutierrez	Prsv, Geom, TKnw
Kimmel	Insv, Eqty, LD
Langford	Prsv, TAtt, TBlf
Loucks-Horsley	Insv, Soc, Tchg
Luft	Curr, Plan, Prsv
Mewborn	Prsv, Grpg, TKnw
Nicol	Prsv, TKnw, Tchr
Papick	Prsv, Curr
Pourdavood	TAtt, Tchg, Prsv
Shotsberger	Tech, Insv
Simon	Insv, TKnw, Tchg
Tobias	Revw, Prsv

Papers

Bowen	Prsv, Tchg, Rep
Chi-chung	Insv, Curr
Gibson	TAtt, Tchg, Insv
Huinker	Insv, TAtt, Tchg
Kennedy	Insv, Revw
McGinnis	Prsv, IC
Mundry	Insv, Plan
Pourdavood	Tchg, Insv
Wang	Insv, Tchg
Zaslavsky	Rsch, Curr, Prsv

Dissertations

Arvedson	NSns, Lang, LD
Canfield	Comm, Rep
Celedon	Ethn, Lang, PS
Gray	Alg, Patt, Rep
Han	Ethn, Lang, Comm
Hines	Rep, Patt, Alg
Izsak	Alg, Knw, Rep
Kehle	PS, Rep, Tchg
Lanier	Patt, PS, Rep
Matos	Geom, Rep, Lrng
Muter	Rep, Prf
Pianfetti	Tech, Rep
Pinzka	Calc, Mscn, Rep
Rittle-Johnson	Decm, Rep, Lrng
Tan	Lang, PS

Articles

Anderson	Calc, GCal, Rep
Brenner	CC, Rep
Clements	Rep, Geom
Doerr	PS, Rep
Douck	Clln, Geom, Rep
Gfeller	PS, Rep, Arth
Kamii	Arth, Rep
Kieran	Alg, Vis, Rep
Linchevski	NSns, Rep, Tchg
MacGregor	Alg, Lang
Molyneux-Hodgson	Comp, Rep, Soc
Moschkovich	Rep
Tsamir	PS, Knw, Rep
Verschaffel	PS, A/S, Rep
Watson	Stat, Rep

Papers

Bowen	Prsv, Tchg, Rep
Gomez	Alg, Rep, Ach

Language, psycholinguistics (Lang); Representations, modeling (Rep)

Dissertations

Alfred	Lrng, PS, Styl
Bang	Lrng, Eqty
Baynes	Geom, Ach, Lrng
Bergthold	GCal, Lrng, Patt
Blasquez	Curr, TBlf, Lrng

Boone	Lrng, Curr, Styl
Bucci	Phil, Prsv
Burkett	Writ, Lrng
Campbell	Prsv, Lrng, TKnw
Carter	Curr, Lrng
Charles	Lrng, Tchg
Crumbaugh	Lrng, Oral, CIln
Dupree	Att, CIln, Lrng
Elshafei	Grpg, Lrng, Tchg
Fairman	Curr, Lrng, TBlf
Feldberg	PS, Lrng
Geoghegan	Curr, Lrng
Handley	Curr, Lrng
Jones	Att, CAI, Lrng
Kerr	Ach, Lrng
Kim	Curr, Lrng, Patt
Larriva	Lrng, Gend, Comm
Lees	Lrng, Ach
Mabbott	M/D, Lrng
Matos	Geom, Rep, Lrng
Melillo	Alg, Lrng
Mitchell	Writ, Lrng
Naylor	Lrng, CAI, PS
Price	CIln, Lrng, Knw
Ridlon	Att, Curr, Lrng
Ritson	Prob, Lrng
Rittle-Johnson	Decm, Rep, Lrng
Socharto	Ach, Att, Lrng
Stephan	Meas, Lrng
Vancleave	GCal, TBlf, Lrng
Walker	Tchg, Lrng, PS
Wang	Prsv, Tchg, Lrng
Weinstein	Lrng, Knw, Att
Weir	Insv, TKnw, Lrng
Yamamoto	M/D, Lrng, PS
Yee	Curr, Lrng, Assm
Zhu	Knw, Lrng, Rsch

Articles

Batanero	Prob, Stat, Lrng
Burton	Phil, Lrng
Carlson	PS, Lrng, Knw
Fischbein	Mscn, NSns, Lrng
Forster	Lrng, Tech, Grpg
Noss	Curr, Phil
Nunez	Lrng, Soc, Ethn

Papers

Boaler	Soc, Lrng
Gregoire	TAtt, TBlf, Phil
Zhou	CC, Lrng, Soc

Learning, learning theories, cognitive development (Lrng); Philosophy, epistemology (Phil)

Dissertations

Adleman	CAI, PS, Prf
Ahn	Att, CAI, PS
Alfred	Lrng, PS, Styl
Bellisio	Alg, Comm, PS
Bergthold	GCal, Lrng, Patt
Bush	Alg, Prf
Celedon	Ethn, Lang, PS
Choi	PS, Att
Dickerson	Gend, PS, Styl
Feldberg	PS, Lrng
Flowers	Curr, RaPc, PS
Foret	Prf
Gannon	CAI, PS
Goudelock	Att, Comp, PS
Gray	Alg, Patt, Rep
Havill	Prob, PS
Hendricks	Blf, PS, Stat
Hines	Rep, Patt, Alg
Jean	PS
Jean	Ethn, PS
Kehle	PS, Rep, Tchg
Kelley	Att, PS, Tchg
Kim	Curr, Lrng, Patt
Krebs	Alg, Curr, Patt
Lanier	Patt, PS, Rep
Laudien	Matl, Curr, Prf
Marinas	PS, CAI, Styl
Mcgivney-Burelle	PS, Knw, Mtcg
Melita	Prf, Tchg, Matl
Muter	Rep, Prf
Naylor	Lrng, CAI, PS
Reiter	Att, Soc, PS
Rosa	PS, CC, Ethn
Runde	Alg, CAI, PS
Serafino	Knw, PS
Shawal	Vis, CC, PS
Stannard	Ach, Patt, Manp
Stevens	IC, Patt, Knw
Suzuki	Assm, PS, Prf
Suzuki	Assm, PS, Prf
Tan	Lang, PS
Tinkler	Assm, Gend, PS
Vahey	Prob, PS, CAI
Walker	Tchg, Lrng, PS
Williamson	Ethn, PS, CC
Yamamoto	M/D, Lrng, PS

Articles

Ainsa	Comp, Manp, PS
Battista	PS, Geom, Manp
Bussi	PS, Tchg, CIln
Carlson	PS, Lrng, Knw
Chapman	PS, TBlf
Chroge	PS, Tchg
Clarke	Tchr, PS
Cobb	Oral, Soc, PS
Croy	Comp, Prf, Vis
Doerr	PS, Rep
Fast	Prob, PS
Fraivillig	TKnw, PS
Gfeller	PS, Rep, Arth
Hazzan	Alg, PS, Lrnr
Holton	PS, Curr
Inagaki	Oral, CC, Prf
Lowrie	PS
Mingus	Prf, TAtt, TBlf
Sherman	Tech, PS, Gend
Stacey	Alg, PS
Steele	LD, Comp, PS
Tirosh	Mscn, PS
Tsamir	PS, Knw, Rep
Tzur	Frac, PS, Comp
Verschaffel	PS, A/S, Rep
Verschaffel	PS, Tchg
Walen	PS, CIln, Grpg
Wheeler	PS, Comp
Yusof	Att, PS, Grpg

Papers

Abbott	PS, Tchg
Benko	D/R, PS
Durr	PS, Ach
Mitchell	Ach, PS, Est

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